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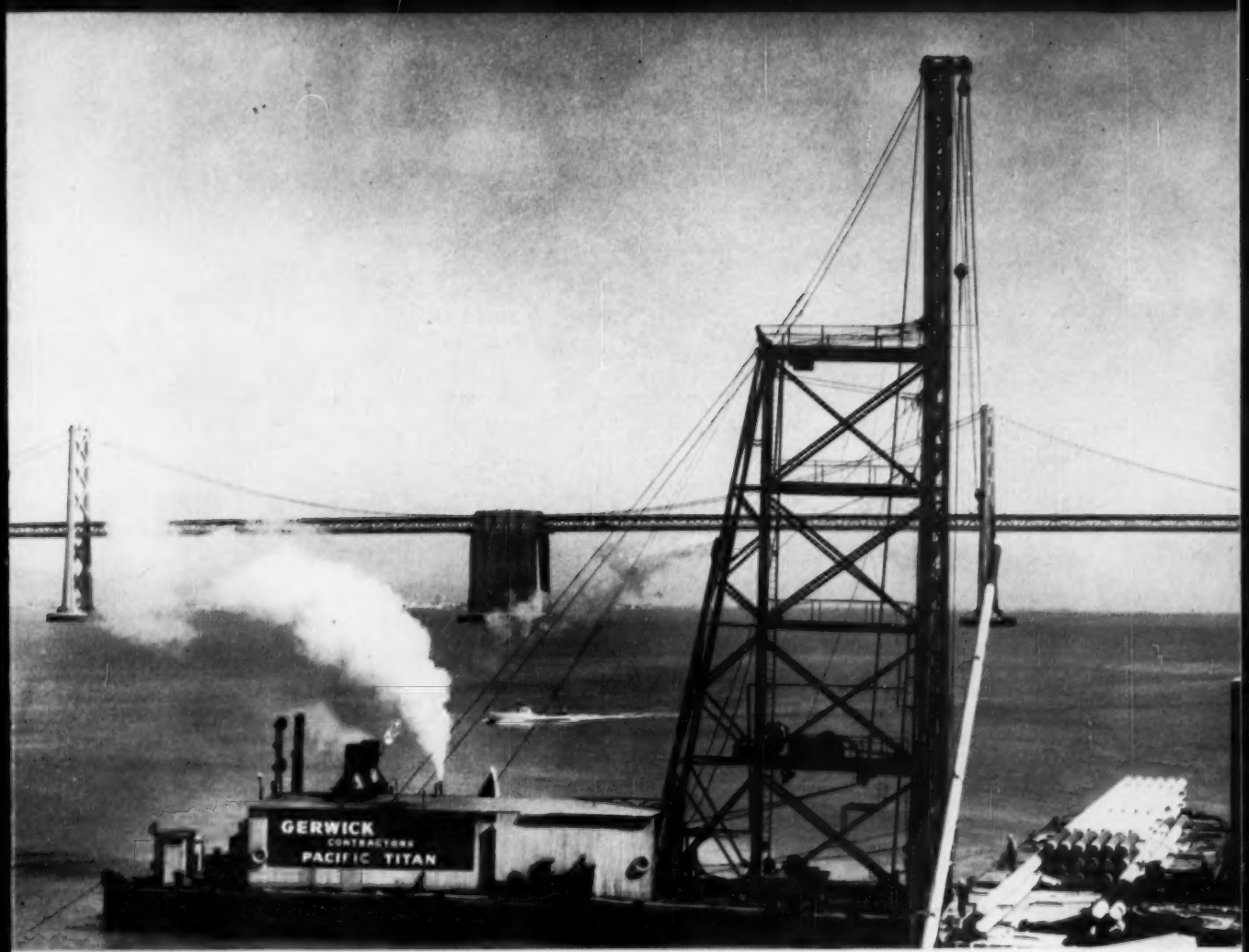

Pretensioned piles for pier run 132-ft long p. 33

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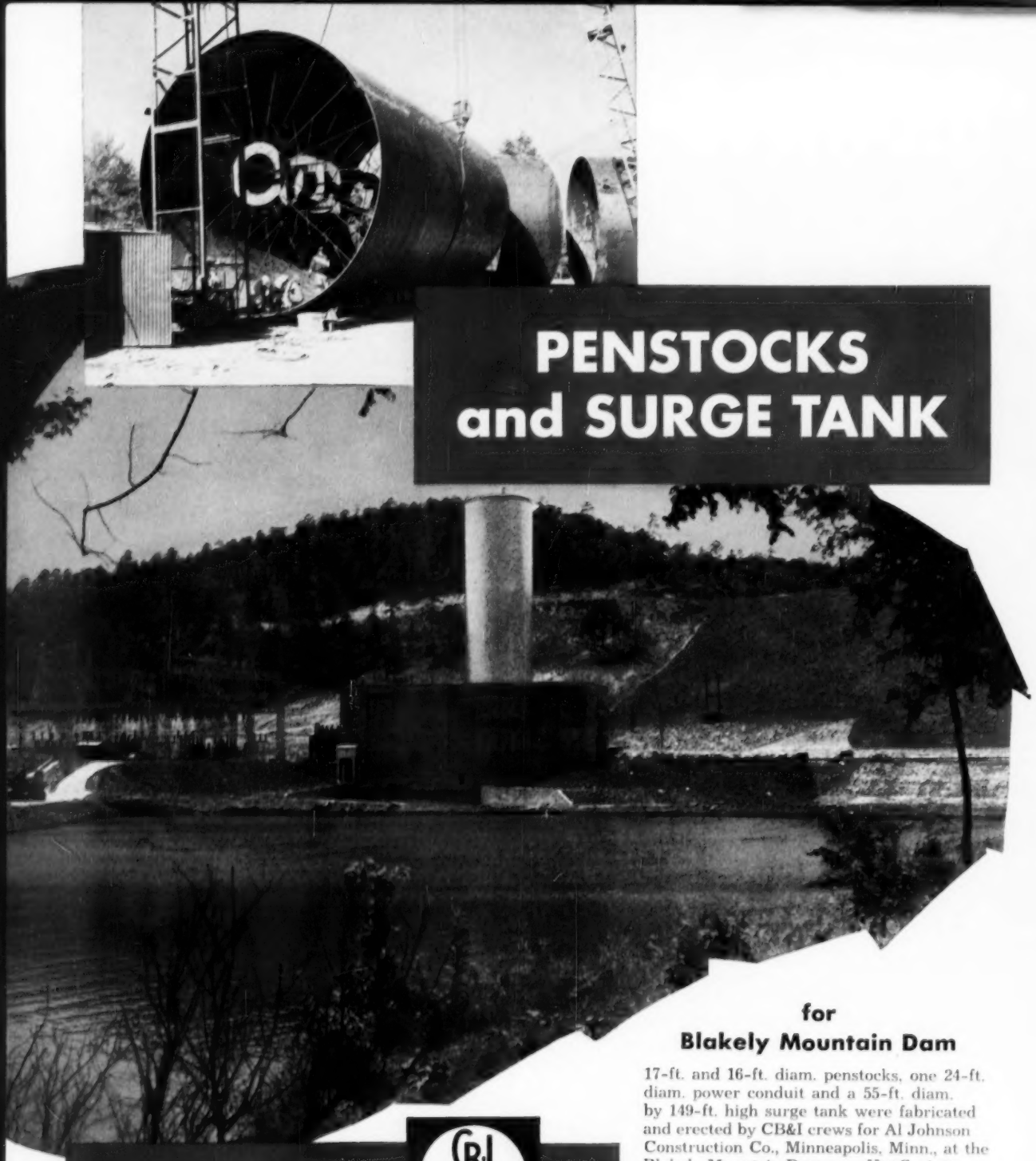

PENSTOCKS and SURGE TANK

for Blakely Mountain Dam

17-ft. and 16-ft. diam. penstocks, one 24-ft. diam. power conduit and a 55-ft. diam. by 149-ft. high surge tank were fabricated and erected by CB&I crews for Al Johnson Construction Co., Minneapolis, Minn., at the Blakely Mountain Dam near Hot Springs, Arkansas. The dam, built for the Corps of Engineers, U.S. Army, is a project of the Vicksburg District Corps of engineers.

The equipment supplied the Blakely Mountain Dam is typical of pipe lines, penstocks and steel plate structures CB&I has built for hydroelectric generating plants and for water diversion projects all over the world. Our plants are completely equipped to design, fabricate and erect steel plate structures to meet *your* specifications.

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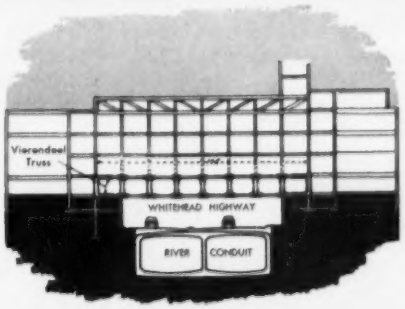

Largest Vierendeel Trusses in U. S.

Two of the five Vierendeel trusses used in this new public library at Hartford, Conn., are believed to be the largest in the United States. Vierendeel trusses were selected for the construction of the library because the large panels without diagonal supports provide open spaces for additional basement storage of books. Also unusual is the library's site. City officials wanted the library near the center of the city, and the building was constructed to span the six-lane Whitehead Highway (see inset) which is over the Park River, the river flowing beneath the highway through a twin conduit. Bethlehem supplied a substantial tonnage of steel for the new library.

Architect: Schutz and Goodwin, Hartford; *Supervising Architect for City of Hartford:* Daniel J. Tasillo. *General Contractor:* Wadhams & May Co., Hartford; *Structural Engineer:* R. W. Loomis, Windsor, Conn.; *Structural Fabricator and Erector:* Lehigh Structural Steel Co., Allentown, Pa.

Shakespeare's Theater Re-Created in Steel

At Stratford, Conn., is a new steel-framed re-creation of old London's Globe Theater, the American Shakespeare Festival and Academy. The new theater, framework of which contains 400 tons of Bethlehem Structural Shapes, is octagonal, and has a 92-ft wide auditorium, about the same as the original Globe. The capacity is also comparable; the original Globe accommodated 2000, including 600 standees; the new theater seats 1500. Exterior is teakwood from French Guiana.

Architect: Edwin L. Howard, Westport, Conn.; *Structural Engineer:* W. W. Chapin, New York; *Steel Fabricator and Erector:* Berlin Construction Company, Inc., Berlin, Conn.

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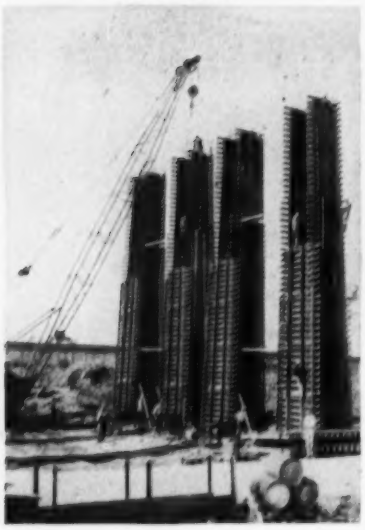

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What is thought to be the highest continuous pour in the area was made by Merritt-Chapman & Scott on its pier construction for the Newark Bay Bridge. For each of the 57 piers, forms were designed for a 10′ liquid head and were set to the full height of the pour. Richmond Tyscrus were used throughout; 123 1″ 4-strut Richmond Tyscrus holding the highest placement – 99′ 9⅜″. Concrete was poured to the maximum design strength of tie rods and forms, and every column went up without incident.

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ENGINEERS: Sanitary Engineering Dept., Government of the District of Columbia.

CONTRACTOR: J. L. McIlvaine Co., Washington, D. C.

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why you *make more money*
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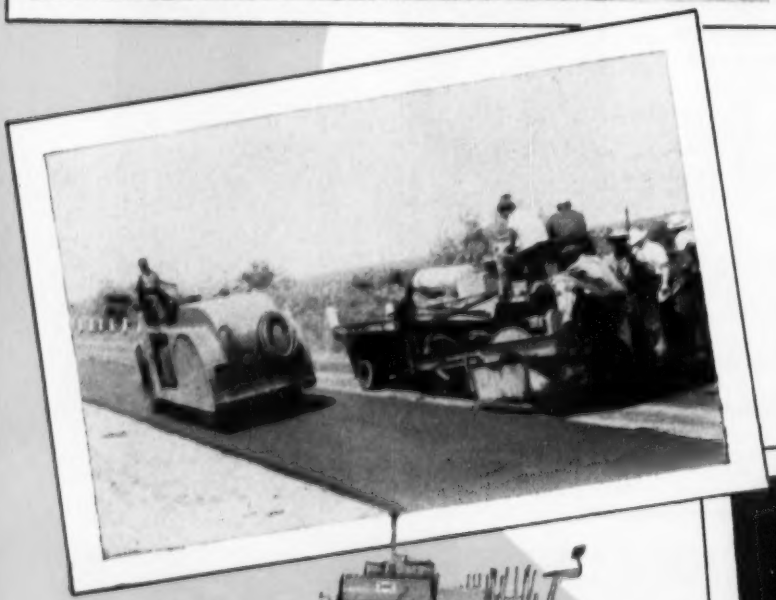
PICTURE PROOF

Traction to Push Boxcar Size Trucks

Handling 15-ton trucks up a 12% grade, as shown at left, is typical of the performance of a Blaw-Knox PF-90 Bituminous Paver Finisher. The PF-90 has more power, 71 H.P., than any other black top paver. This power is efficiently transmitted through tandem axle drive to four large pneumatic-tired wheels that have the proper combination of flotation and traction to push 15 and 20-ton trucks up steep grades on such uncertain footings as tack-coats and stone base material subgrades. Pneumatic tires with the proper tread have long been proved superior over smooth crawler tracks for flotation and traction when working in the conditions encountered by a paver.

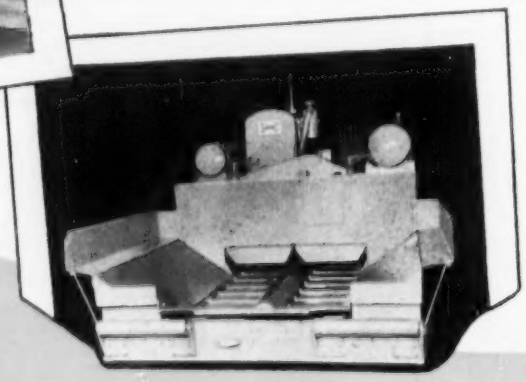


More Speed and Maneuverability

Paver speed can only be measured in the time required to complete the paving job. In addition to working speed in feet per minute of finished paving, where the PF-90 exceeds most machines, you must also consider time consumed for returning and maneuvering for restarts where the PF-90 runs away from every thing. As shown at left, the Blaw-Knox PF-90 can make a long run back for restart with crew, in a fraction of the time it would take a crawler mounted paver to lumber along the same distance at 1½ mph.

600 to 700 Less Wear Parts

With only six rubber-tired wheels instead of 600 or 700 exposed steel parts wearing against each other, which is common to crawlers, a Blaw-Knox PF-90 has much lower maintenace cost. In addition to few wearing parts, rubber-tired mounting absorbs vibration, reduces chatter in screed and wear and tear on the entire machine. The PF-90 frame is so ruggedly designed and constructed that it can take the road strains and vibration to make a Paver that continuously delivers good results.



Big Hopper for 10-Ton Load

You can feed approximately 10 tons in the wide and roomy PF-90 hopper, twice as large as any similar paver—it takes care of the full truck width *without spillage*. Its large size reduces truck dumping time so you can use fewer hauling units.

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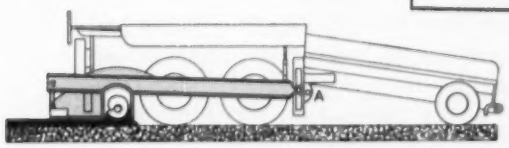
Easy Wheel Steering gives Tight Longitudinal Joints

For top quality work, such as this rigidly specified airport job, the power steering allows fine maneuvering to maintain a tight longitudinal joint. Hydraulic controls combined with rubber-tired mounting provide the ultimate in steering to give the most accurate control. Compare this with crawler-mounted rigs that can only be steered by pivoting the entire machine.

Flow control gates and extra large diameter augers assure better distribution of material for the high paving speed of the PF-90. Vibrating bar tucks material under screed to a uniform density.



Automatic Leveling on Long Wheelbase

The combination of long wheelbase that spans subgrade irregularities and the screed with a floating pivot point, A, above, in front of the driving wheels, assures a constantly level course of the proper minimum thickness.

Easiest Widening of Vibrator and Screed

In a matter of minutes, screed, tamper and auger can be set at any desired width from 8 feet up to 13 feet. Auger extensions merely slide into recessed end of existing auger and are pinned. Screen and tamper section fasten face-to-face and are held by a minimum number of bolts in each. In addition to ease of width change the PF-90's 8-foot basic width, 2 feet narrower than any other paver, allows it to pave driveways and alleys and facilitates transporting.

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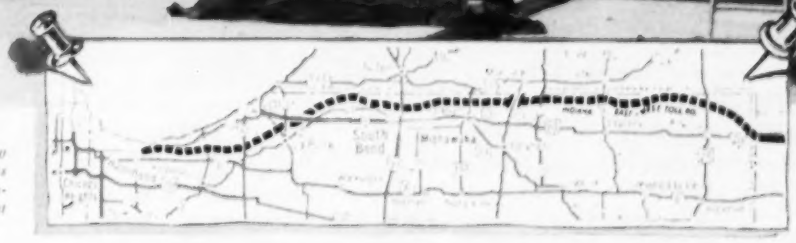

Another great artery in America's growing network of intercity communications comes into being this Fall. This 126 mile expressway linking Chicago directly with the East is the Indiana East-West Toll Road.

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Reader Comment

Thanks

SIR—I want to take the occasion of the signing of the Highway Act of 1956 by President Eisenhower to express my personal appreciation to you for the very fine job that you and your publication have done during the past two years in support of the accelerated highway program. I speak for all of the members of the American Road Builders' Association when I say that I am sure your fine support has been a major contribution to its success.

J. N. ROBERTSON
President
American Road Builders' Assn.

Dome or Segmental Roof?

SIR—Your title "Dome Costs Halved by Design Permitting Removable Falsework" (April 26 issue—new Municipal Auditorium, Dallas, Texas) is somewhat irritating to a dome designer. While the structure has the appearance of a dome, it structurally cannot act as a dome because it has been emasculated by cutting 16 radial expansion joints right across the curved top surface and part way down the columns.

This radical elimination of the three-dimensional dome action must increase the necessary amounts of concrete and steel for the structure, even inside the 204 ft diameter. This inner structure consists of 16 pie-shaped elements stacked together against a center plate.

In a doubly curved continuous surface like a dome, most loads will cause direct skin stresses. Bending in the radial direction is eliminated by the stiffening effect of the horizontal ring elements. With the radial expansion joints, this stiffening effect is lacking, and there must be a sizable amount of bending action in the radial ribs, particularly for one-sided loads. Incidentally, radial joints, which permit re-use of the segmental forms, have been applied on domes in such manner for a number of years.

The use of the cantilevered columns carrying the load of the pie-shaped elements for a distance of 50 ft toward the outside wall is claimed to be economical feature, and particularly it is claimed that hanging loads from intermediate floors are carried more easily by the cantilever columns. Evidently all loads must cause heavy bending moments in the columns, as indicated by their tremendous reinforcing. The large eccentricity of the arch thrust with such cantilevered columns is what requires the tremendous amount of reinforcing.

It seems to the writer that had the pie shapes been larger, making a dome of 300 ft diameter, and had the pie shapes been eventually connected at their radial construction joints, or were the shapes at least connected at their base, on top of the columns, by a horizontal prestressed tension ring, dome action could have been achieved without transmitting heavy bending moments to the columns. Thus the columns would only have to take vertical and wind loads, and would have become very slender, which is a desirable feature for temperature action. A roof on long slender columns does not need expansion joints, but the walls connecting the roof to the non-yielding ground do need them near the base. The joints in the roof of the Dallas structure are, therefore, not necessary for temperature action, and they are there merely to facilitate construction.

Once the joints were closed, the stiffening ribs would lose their importance. These ribs could then be used for distribution of additional hanging loads along the 103-ft radius or any other place. The narrowed hip or kink at the 204-ft diameter does not seem to be particularly useful for carrying hanging loads at this point.

As to constructing, pie shapes for a 300-ft diameter dome could be temporarily supported by inclined cables from a central tower, thus allowing for a free rotation of the falsework. In spite of common belief, forms for larger monolithic domes are not too expensive.

It would be interesting to obtain cost figures on this dome-shaped construction, including particularly the cost of the heavy column construction, to verify the commercial claims which your title implies. At least it should be precisely stated and substantiated just what costs are halved by the method described.

ERIC C. MOLKE
Prestressing Research and Development, Inc.
San Antonio, Texas

SIR—While we did not participate in preparing the ENR article on the Dallas Memorial Building we do agree in essence with its conclusions.

The three dimensional behavior of a monolithic dome is a neat mathematical concept of interest to all engineers. However the designers did not consider this complete three dimensional behavior "as such" of particular pertinence to the design of the Memorial.

While monolithic domes are inherently stable structures, unfortunately they require large circumferential forces where the radius of the dome is large. Furthermore, small local deflections create large increases in radius under the same conditions. Comparative designs showed that elimination of the "heavily" reinforced ribs in the Dallas Memorial would require substitution of heavily reinforced circumferential rings. The suggestion that the rib steel of the Dallas Memorial plus the nominal reinforcement in the thin skin must inordinately increase the average reinforcement over that required for a monolithic dome is an inaccurate statement. The difference in concrete and reinforcing steel quantities is small, and has a subordinate effect on the comparative costs.

Difficulties in the form of volumetric and temperate stress cracks have been experienced in many of the larger monolithic domed structures. It was believed by the designers of the Memorial that the segmental construction used in Dallas would obviate this condition as well as provide many other design advantages. However, this consideration was incidental compared to the more overriding economic issues.

The formwork costs for roofs perched 50 ft to 100 ft in the air are inherently expensive. Any design and construction method permitting the moving and re-use of the formwork reduces this overall cost almost in proportion to the reuse. The ribs of the Dallas Memorial accomplish this purpose by stiffening and supporting the edges of the individual segments as the form is moved. A dome shell having dimensions and reinforcement determined by action as a monolithic dome would obviously be unstable until the last pour is in place. While alternate systems of achieving formwork re-use are undoubtedly feasible, the writer would be extremely wary

Engineering News-Record welcomes expression of opinion from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance.

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In Pennsylvania . . .
the Marsolino Construction Co., Uniontown, Pa., uses this ¾-yd. 22-B on turnpike extension work near Center Square. Quick-fill, easy-dump dipper and good maneuverability are two of many features that make the 22-B a profitable machine to own.

In Washington . . . this 1½-yd. 38-B cuts access road through wilderness of Olympic National Park for Bureau of Public Roads. Machine is owned by Hugh Govan, Port Angeles. Heaped dippers and fast cycles make Bucyrus-Eries ideal for road construction work.

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In Massachusetts . . .
S. J. Groves & Sons use this 4-yd. 88-B to load blasted rock for the Massachusetts Turnpike project near Blanford. The 88-B has a twin rope balanced crowd system that permits operator to obtain the most effective dipper speed when both hoist and crowd are needed — providing great digging force. All Bucyrus-Erie components are arranged for easy maintenance.

In Colorado . . .
this 38-B loads granular base material for state highway department on job near Monte Vista. The Pioneer Construction Company of Pueblo is the owner of this machine.

In Georgia . . .
this ½-yd. 15-B digs fill near Flintstone for state highway department. Fewer parts, anti-friction bearings, superior materials, and careful coordination of working parts puts every pound of weight to work . . . makes the 15-B most efficient in its size range. The machine pictured is owned by W. J. Coulter, St. Elmo, Tennessee.

In Kentucky . . .
this 3-yd. 71-B loads trucks at one stretch of the Kentucky Turnpike. Its owner is Traylor Brothers Contracting Co., Evansville, Ind. Power and coordination to handle heavy rocks smoothly and efficiently make the 71-B truly a "big league" performer.

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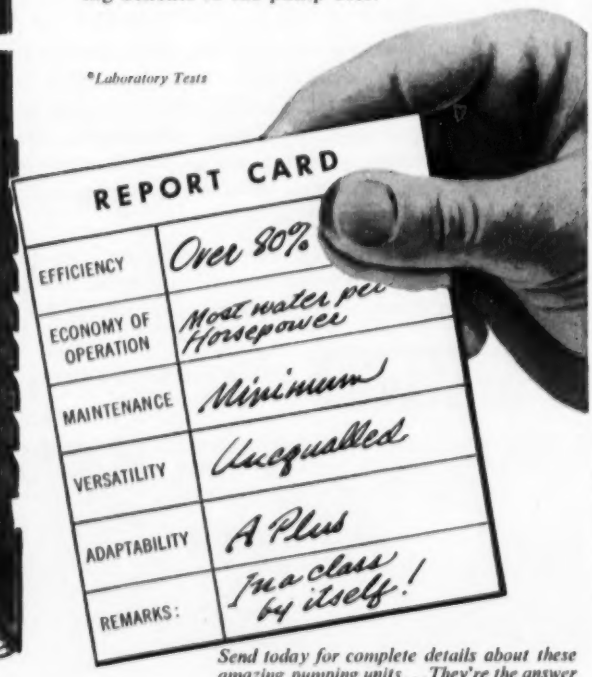

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. . . Reader Comment

of temporarily supporting unstiffened portions of a partially completed dome by means of a flexible suspension system anticipating eventual connection of thin shell segments that have been undergoing dead and possible live load erection strains. In any case the cost of the long span suspension system, suspenders, connections and main cable towers and anchorages would unavoidably be added to the cost of the roof.

A circumferential tie at the top of the vertical legs is suggested as desirable. It would appear that auxiliary supports or supports in the form of the arch and frame used in Dallas would still be required during the construction of the separate elements, after which these costs would be duplicated again by the cost of the proposed tie system.

Comparison of costs for a monolithic dome versus a segmental dome for the Dallas Memorial resulted in the following comparative engineers' estimates:

		Monolithic Dome		Segmental Dome
Concrete	7.9 in./s.f.	$0.63	9.7 in./s.f.	$0.77
Reinforcing Steel	4.9 psf @ $.20	0.98	8 psf @ $.18	1.44
Formwork	(Single Use)	4.50	(Eight Uses)	1.10
	Total	$6.11		$3.31

The above estimates do not include the costs of the lower part of the vertical leg used to support the segmental dome at Dallas nor do they include the cost of the alternate vertical leg and prestressed tie that would ordinarily be used for the monolithic dome alternate. The contractors bid breakdown price for the Dallas roof formwork was $1.25 psf.

BOYD G. ANDERSON
Consulting Engineer
New York, N. Y.

Older Sunk-in-Place Tunnel

SIR—It was of great interest to me to note Mr. James Wilson's letter (ENR June 7, p. 14), concerning statements made on page 59 of the April 19th, 1956 issue. Mr. Wilson directed attention to two sunk-in-place traffic tunnels built prior to 1925. This however, did not complete the story as Mr. Wilson's letter seemed to intend.

By confining the present discussion to the trench-type subaqueous traffic tunnels constructed in the pre-1925 era—whether built in situ or prefabricated, floated, and sunk to a prepared bed by dredging—engineering and historical records indicate this type of subaqueous tunnel dates from 2180-2160 B.C. when the Babylon Tunnel was built under the Euphrates River

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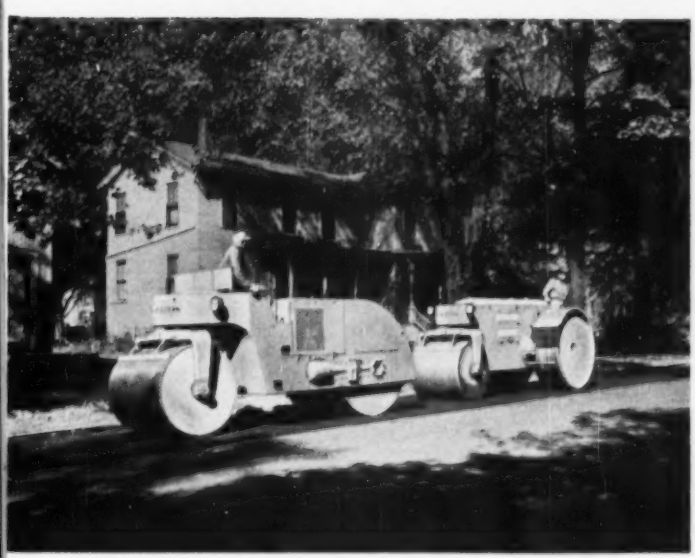

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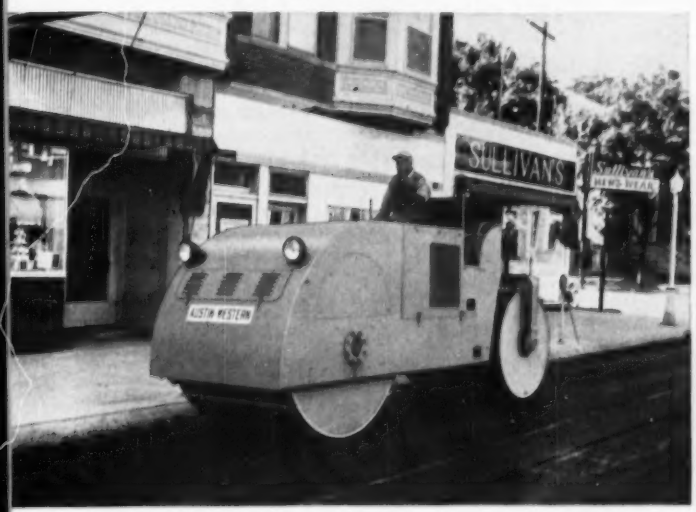

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between the royal palace and the Temple of Jupiter, in Babylon.

It was a passageway 12 ft wide by 15 ft high with a river section about 600 ft long and a total length of more than 3,000 ft. Barring further archaeological evidences showing this type of tunnel of still more remote antiquity, the Babylon Tunnel is at present regarded as the most ancient of the trench-type subaqueous traffic tunnels.

The modern revival of the ancient idea dates from 1854 when Joseph R. Miller published in New York an account of what he styled as "Miller's Submarine Avenue". These bona fide historical facts make this type of tunnel Asian in genesis and American in revival.

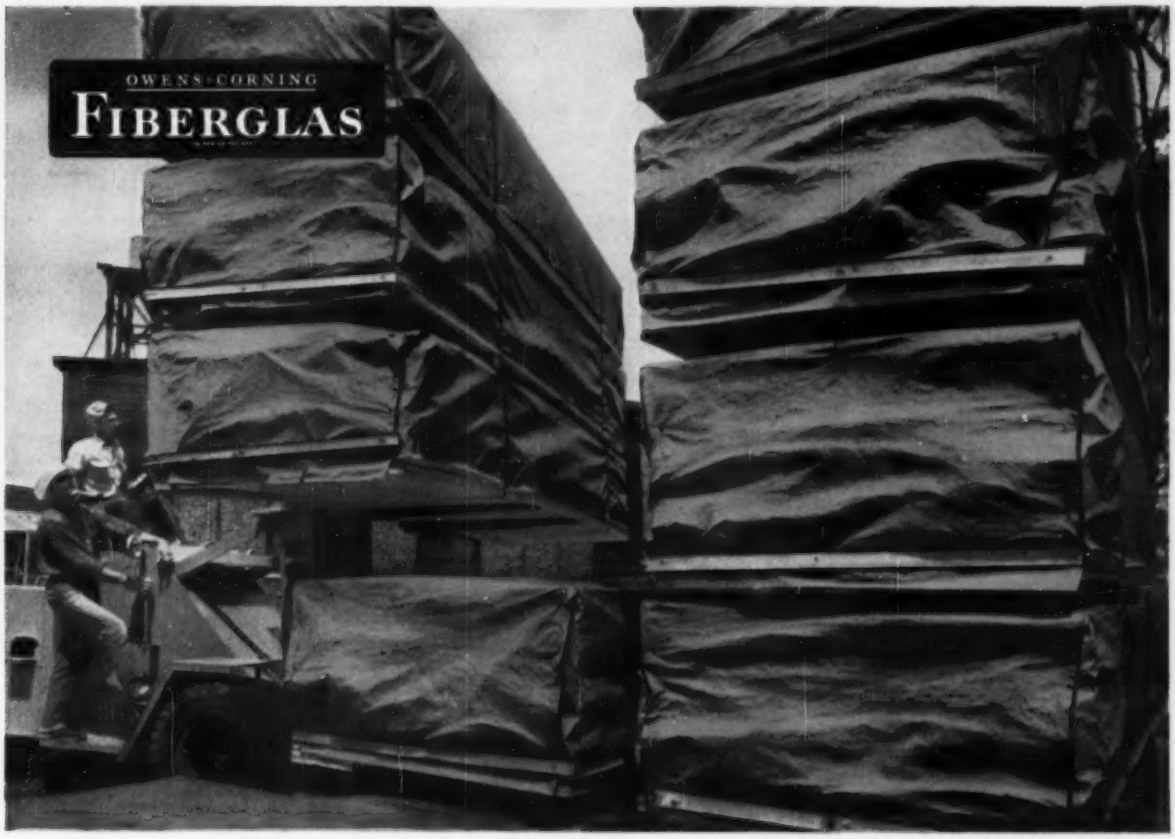
The earliest version of this type of subaqueous traffic tunnel appeared in continental America as the Chicago River Washington Street Tunnel, originally built in 1866-69 inside a cofferdam, and later in 1910 lowered to allow the passage of larger river craft. Next came the first Harlem River Subway Tunnel of the first New York Subway Extension from Manhattan to the Bronx. This two-track tunnel of the Lenox Avenue Subway was built as "Siamese Twins" under the Harlem River of New York, and completed in 1904. Following these two early American examples, the Pont Mirabeau Crossing subway tunnel of Paris, France, was constructed under the Seine River in 1906.07.

The first truly prefabricated, floated, and sunken traffic tunnel built with an application of Archimedes Principle is found in the Detroit River between Detroit, Michigan, and Windsor, Ontario.

The construction started in 1906 and was completed in 1910. The engineering profession is deeply indebted to Mr. Wilson Sherman Kinnear for his integrated, complete account of "The Detroit River Tunnel" in a 69-page paper published in both the Proceedings and Transactions of ASCE in 1911.

The next railway tunnel of this type is the twin-tube La Salle Street Tunnel, built in 1909-12 under the Chicago River. Then came the Harlem River Subway Tunnel, containing four tracks of the Lexington Avenue subway extension from Manhattan to the Bronx. This tunnel was built in 1912-14.

The above account would complete the records up to 1925, a year specifically referred to in both the April 19th article and Mr. Wilson's letter. The year 1925 is, however, signficant in that the construction of this type of vehicular tunnel was started under the



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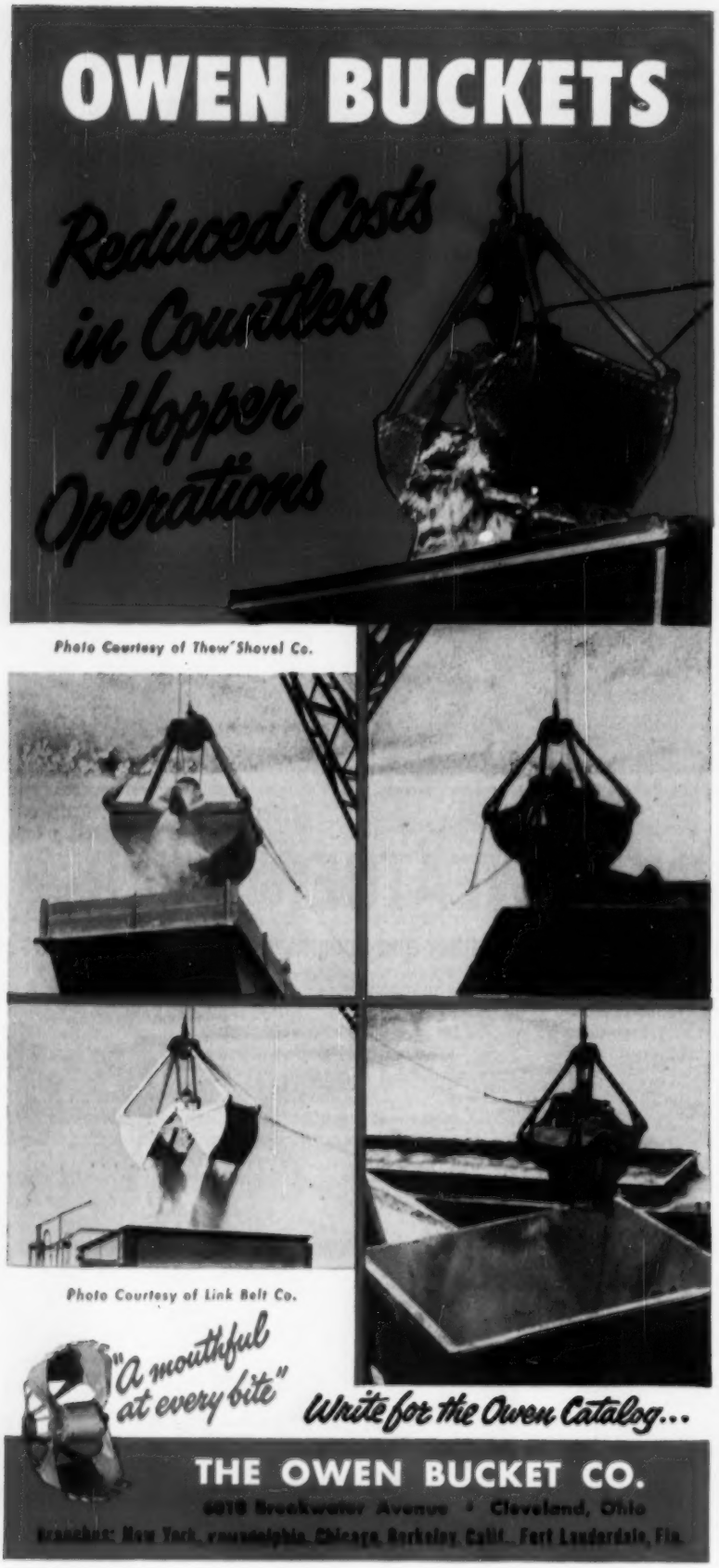
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Oakland Estuary between Oakland and Alameda, California. Not only is this the first vehicular tunnel of this type, but also it was later named the George A. Posey Tube in honor of the engineer who executed the project.

From the George A. Posey Tube, started in 1925, to the Patapsco Tunnel now under construction in Baltimore, there are altogether 19 trench-type subaqueous traffic tunnels that have been built or are being built in the entire world.

SHU-T'IEN LI
Consulting Engineer
Mobile, Ala.

Resistance to Explosion

SIR—After some 30 years' experience as inspector of factories in the U. K., India, etc., and resultant investigation into explosions of many kinds in flour mills, oil mills, sugar mills, paint factories, etc., I was naturally interested in the letter of Professor Peck (ENR May 17, 1956, p. 8) relative to the grain elevator explosion in Philadelphia. I am of the definite opinion that the problem is not one of design to resist blast, but rather of design to prevent explosion or, when explosion does take place, to permit its force to exhaust itself as quickly as possible.

Dust, rather than gas or fumes, is the greatest possible source of explosion, and it only needs a spark to cause major havoc. Design measures, therefore, should include elimination of dust at source, or through periodic cleaning of trusses, girders, ledges, etc. Dusts have been graded according to their potential liability to explosion, and the designer should bear this in mind in planning every building for industry. Similarly, where the dust hazard is likely to be present, he should plan for relief panels, vents, etc. in the factory building.

My experience is that even today there are many engineers and designers who are completely ignorant of these matters, or who dismiss them as irrelevant to their planning.

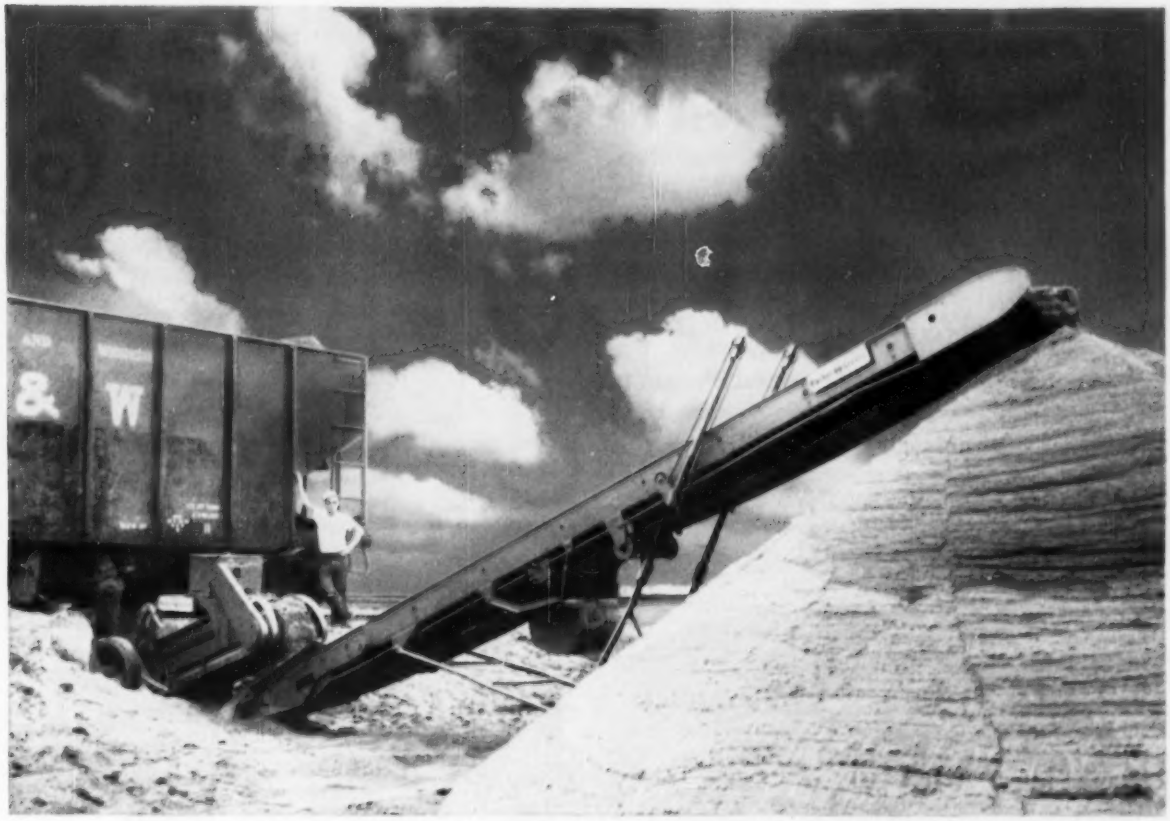
A. B. CRAWFORD,
Director,
German Tractors & Machinery Co.,
Karachi, Pakistan.

CALENDAR

Society for Experimental Stress Analysis, annual meeting and exhibit, Deshler-Hilton Hotel, Columbus, Ohio, Nov. 1-2.

Noise Abatement Symposium, seventh annual meeting, Hotel Sherman, Chicago, Ill., Oct. 11-12.

Sixth Annual Drilling Symposium, The University of Minnesota, Minn., October 11, 12, 13, 1956.



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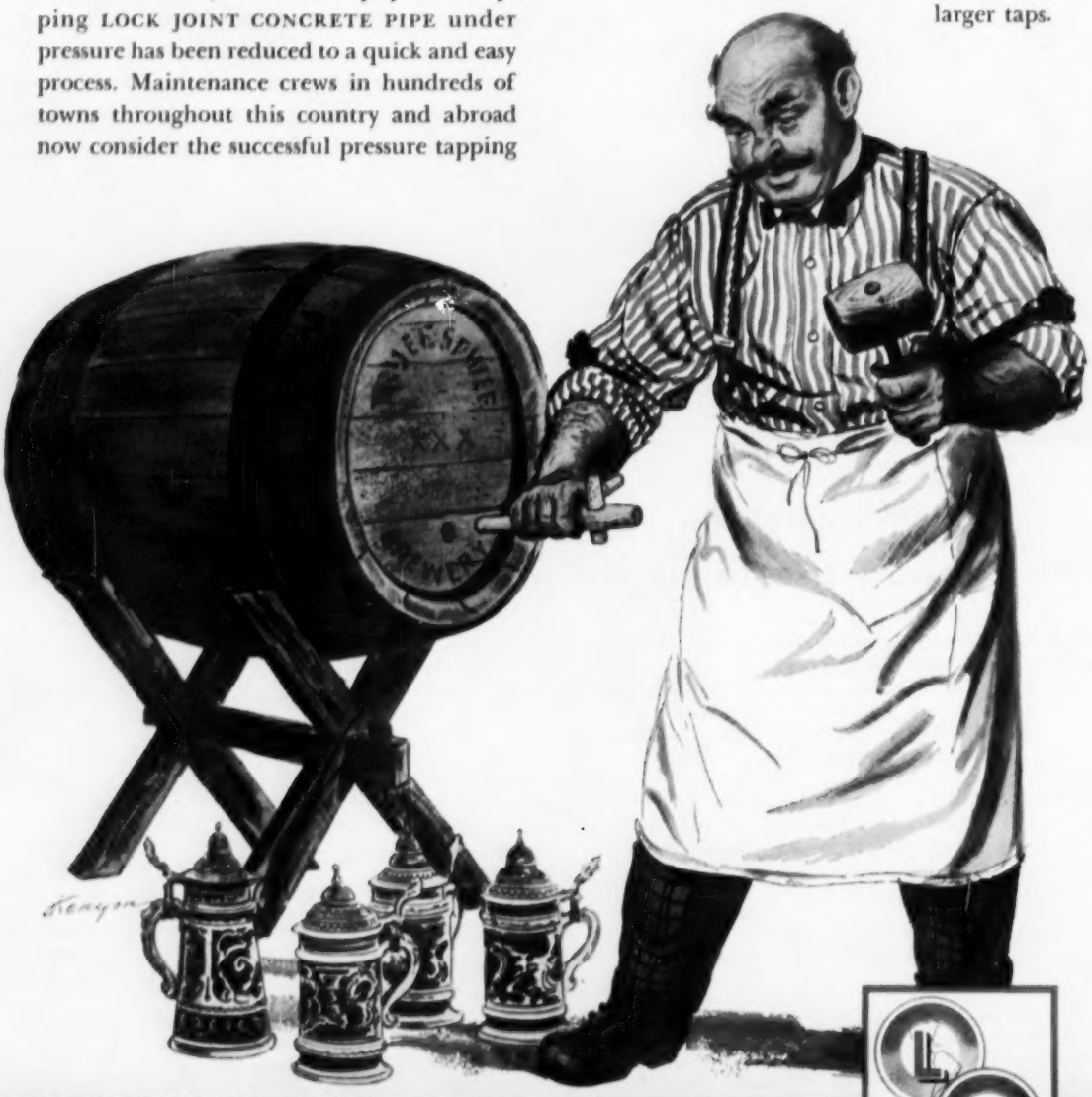

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THE CONSTRUCTION WEEK

ASCE VOTES FOR NEW YORK—The Board of Direction of the American Society of Civil Engineers has concurred with the recommendation of an inter-society committee that Engineering Societies Headquarters should remain in New York. The ASCE Board's June meeting, which was recessed—not adjourned—was called back to order in New York July 10 just to consider the report of the Founder Societies committee of 15, which had recommended no move for the nation's engineering center. ASCE's directors liked the recommendation.

MORE THREATS TO PROFESSIONALISM—Last week in Alabama, the Mobile County Commissioners voted a resolution passing the cost of architectural and engineering "mistakes" (nominally change orders to the construction contract) for a new courthouse to the respective design firms, and then okayed payments to them for preliminary plans. The designers (Palmer & Baker of Mobile is one) have not indicated whether they would continue with final plans and specifications, but local engineers shrugged off the Commissioners' action as "foolish and unenforceable," attributing it to the sweltering heat and election year politics.

On a second front, ASCE and NSPE protests to South Carolina officials over the State Highway Department's recent call for bids for engineering services are thus far successful: Bids were due in June and no award has yet been made. NSPE also had written an open letter to consulting engineers in the Southeast requesting them to refrain from bidding.

CONTRACTOR PREFERENCE LAW FAILS—Although the Louisiana legislature adopted a measure requiring the state and its subdivisions to give Louisiana firms preference in making purchases, a similar measure applying to contractors failed to get through.

MICA CREEK DAM OKAYED—A high-level federal-provincial meeting in Victoria, B. C., agreed on early construction of Mica Creek Dam on the Upper Columbia River in Canada—but not before agreement is reached with the U.S. on downstream benefit reimbursement. British Columbia Premier W. A. C. Bennett and Federal Resources Minister Jean Lesage issued a joint statement calling for detailed engineering studies at the dam site, while the latter confirmed that preliminary embassy discussions are under way for a diplomatic-level meeting in the fall between Canada and the U.S. on the reimbursement question. The Bennett-Lesage statement did not indicate whether divergent federal and provincial proposals on downstream benefits had been merged for presentation to the U.S.

OHIO COUNTY FOUND ANSWER TO TODAY'S SLOPE CONTROL PROBLEM IN 1938

In 1938, one of the first installations of newly introduced Armco Bin-Type Retaining Walls was made to control a slope above this important county road.

16 years later another Armco Wall was installed to control the slope below the same road. Original wall is at the right.

In 1938 Clermont County, Ohio, tackled an unstable slope problem along one of its roads with a new type of earth control product—Armco Bin-Type Retaining Walls. Other types of slope control had been tried but they lacked the stability and durability required. Today the Armco Wall is still on the job, in excellent condition.

Then, in 1954 another slope control problem developed below the same road. By this time the economy, stability and durability of the all-metal, bolted construction had been proved in service. Another Armco Wall was the logical answer.

Get the complete Armco Retaining Wall story now and see how easily and permanently you can solve *your* earth control problems. Write us for helpful data. Armco Drainage & Metal Products, Inc., 4516 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

ARMCO BIN-TYPE RETAINING WALLS

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WASHINGTON OBSERVER

Talk in Washington of a recession is evaporating. Indeed, there is a new boom feeling.

Newest figures show that first quarter construction, despite the housing downturn, is continuing to boom. And general busines which determines how much new plant is built, is so much better that the earlier gloomy forecasts for this year now look almost foolish.

New construction right now is running only $100 million under the 1955 total of $32.7 billion, and the big third and fourth quarter activity is not yet measured. Even if housing continues to be sluggish, total construction by the end of the year will still be up.

•

The steel strike will not hurt the new construction program, at long-range. At least, that is the view of government people. An historical review of consequences of major strikes in the past—both in coal and steel—show that good times followed a long shutdown. Only in 1920 and 1937 did business fall off after strikes—and in neither was the labor dispute regarded as a prin e factor.

•

The strike has brought new pressure to step up capacity for structural steel. This has been one of the chronic headaches of the industry. Producers say it's a low-profit, expensive to make item; consumers say structurals have been chronically short for years and a drag on all construction. With the highway program coming along, structural capacity problems acquire a new urgency.

Contractors complain that even before the strike, it took up to 18 months or more to get deliveries of structurals, and that if the government can do anything about it, expansion of such capacity should get top priority.

Government officials are inclined to go along but still aren't sure that permitting steel producers fast amortization on new capacity would get the new capacity built. There's still a general Administration policy to cut back on fast amortization grants.

•

Democrats are getting prepared for a new probe on fast amortization. There's still some question whether political ammunition can be fashioned for the fall campaign but Cong. Wilbur Mills, (D, Ark.) a key member of the Ways and Means Committee who is to be chairman of the new subcommittee, will be digging deep into the whole amortization question.

One outcome could be a drive to repeal the 1954 tax that gave companies a "permanent fast tax write-off"—the option of deducting two-thirds the cost in half the life of investment in new plant capacit

The new committee will be busy for a few months hiring staff and isn't expected to hold hearings until after elections, or perhaps early next year. But—whether Republicans or Democrats win control of the House of Representatives—you can look for action from this new Washington influence on tax matters.

•

The building trades unions are still dragging their feet on CIO-AFL merger. Though Pres. Richard Gray has formally agreed not to carry on active opposition to mergers in the various states, local and state bodies are still resisting. The big areas of conflict: New York and Michigan.

•

Egypt's huge Aswan Dam won't get any of the new foreign aid money just being voted by Congress, if the Senate Appropriations Committee has its way. The committee's rider says its approval must be given before any of the money can be used for furthering the dam. The U.S. originally proposed $55 million in U.S. assistance; World Bank would be the major source of credit if the U.S. and its allies eventually back the project.

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As the 84th Congress nears adjournment, here's . . .

Eisenhower's Record on Construction

A Washington Staff Report

The four-year record of the Eisenhower Administration's federal public works policies and expenditures was just about completed this week as the 84th Congress raced down the home stretch toward adjournment and the national party conventions.

Stand-out accomplishment from the construction industry's standpoint, of course, was the history-making federal aid highway bill.

Notable, too, in view of the eagerness to hold down federal outlays in the early days of its tenure, was the Administration's willingness to give all-out backing to major river development and to support a number of new water resources projects.

Although it fought hard to advance its concept of developing certain sites by local-federal or private-federal partnership arrangements, the Administration was strongly behind the enactment of the Upper Colorado River Storage Project and is still striving for passage of the related Frying Pan-Arkansas project.

Efforts to get private capital and local governments to shoulder more of the burden of public improvements continued to be a distinguishing feature of the Administration's approach to public works and federal aid to construction.

Emphasis on state and local responsibilities was further underlined by creation of a special assistant to the President to coordinate and promote advance public works planning of the non-federal governments.

Here, are the major programs and policies as they have been developed by the Eisenhower Administration over the past four years:

▸ Highways

Eisenhower hit the jackpot with his bold plan for highways which was announced two years ago. Enacted last month and already in effect, "the greatest public works program in history" is far and away the biggest construction monument of this Administration.

Modified to meet Congressional obstacles as it went along, the federal program proposes to do in 13 years what Eisenhower wanted to accomplish in 10. Increased highway user taxes will pay for the roads as they are built—a departure from the original Administration plan to employ bond financing in preference to raising federal excises.

Essentially, though, the federal program is an Eisenhower project, remodeled to pay-as-you-go pattern by a Democratic Congress. It assures $25 billion in federal authorizations over 13 years to complete 41,000 mi of the nation's main interstate system. In addition, the new legislation substantially increases funds for other federal-aid roads in the next three years.

Federal allotments for highways go up fast—from $875 million in the fiscal year just ended to $2 billion this year, $2.55 billion next year, and $2.875 billion in fiscal 1959. Because the bulk of the added money is for interstate construction, however, with the states contributing no more than 10% of the cost (instead of the 50% required on other roads), the total volume of federal-aid work doesn't rise in the same ratio. Potential volume increases from about $1.6 billion last year to something under $4 billion in fiscal '59.

Both Congress and the Administration want to strengthen the federal government's administrative setup for handling highway matters. But, current proposals differ widely.

Sen. Albert Gore, Chairman of the Senate Roads Subcommittee, would transfer the Bureau of Public Roads from the Department of Commerce to a new Federal Highway Commission of three, appointed by the President. The Administration, on the other hand, would keep BPR in the Commerce Department but place at its head a Federal Highway Administrator to be named by the President. Also, an Assistant Secretary of Commerce would be added to help the Undersecretary for Transportation.

Bills have been introduced on both proposals, but there is little chance for any legislation in the remaining days of this session. They show what to expect next year, though. The House Roads Subcommittee was favorably impressed last week by testimony of Commerce Secretary Sinclair Weeks on the Administration bill. And Senator Gore argued strongly for an independent, nonpartisan commission when he introduced his bill.

Nobody wants to disrupt the well-established Bureau of Public Roads organization. Under either proposal, the bureau would continue to perform all the routine functions of operating and administering the federal-aid program. But many highway people are skeptical about administrative changes that might slow progress at a critical time and open the door to political pressures.

BPR in any event is sure to get an infusion of new blood and top-grade personnel to handle the expanded program. The agency figures, and Secretary Weeks agrees, that a 25% buildup in force will do the job. Several hundred engineers will be added to the present staff of 1,100.

Some of the bureau's low-salary ills can be cured if Congress acts favorably, as expected, on a bill, now before it. BPR then would get the right to fill 22 additional positions in the $12,900 to $14,800 salary range. It has very few jobs paying that kind of money now.

▸ Housing

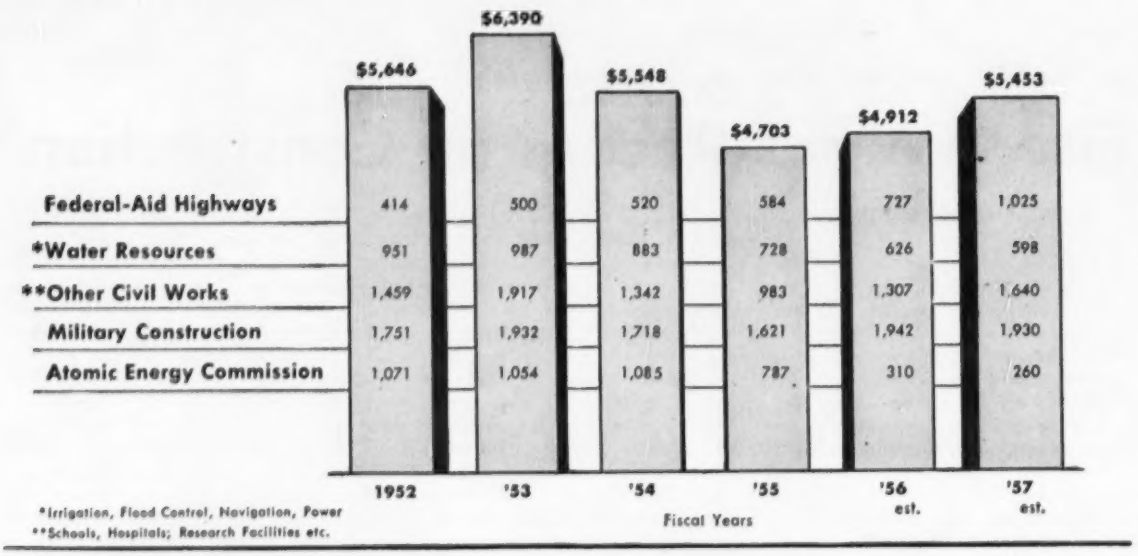
Although this Administration concedes that the American people have a demand for and can pay for new homes at the rate of 1,300,000 a year, it does not hesitate to apply restraints on insuring mortgages whenever it feels inflationary influences are at work.

Last year, housing starts topped 1,300,000 for the first time since the peak year of 1950. But, 1955 also saw the federal government tightening the terms on FHA and VA mortgages in response to a recurrent threat of inflation. This action has contributed to a downturn in this year's housing starts which are now running at a rate of 1,100,000.

At the same time, the Administration has attempted to hold down federal loans and grants for public and military housing and college dormitories. The policy here is to encourage private capital to enter these fields of investment.

Urban renewal receives enthusiastic

Federal Construction Expenditures (in millions)



Administration support because of the possibilities it offers for private enterprise and the local governments to participate and thereby expedite the rehabilitation of blighted neighborhoods and the replacement of slums. Both Congress and the Administration back federal payment of two-thirds of the write-down cost incurred in selling cleared sites to redevelopers. Federal officials also urge local authorities to borrow from private sources instead of tapping the federal government for redevelopment loans.

Eisenhower and Congress get into a tangle each year over public housing. The President wants a moderate program of 35,000 units a year authorized for at least a two-year span to give his public housing officials a chance to organize and schedule their operations more effectively. As it is, they are forced to wait out a period of uncertainty each year while a sympathetic Senate and a hostile House battle to an annual compromise. Last year Congress compromised on 45,000 units—largest number to be authorized during this Administration—but again only on a one-year authorization. This session may bring another 45,000-unit authorization, despite bitter opposition in the House, where the Rules Committee has blocked action on an overall housing bill.

▶ Military Construction

Expenditures for construction of military public works haven't gone the way Eisenhower planners expected. Two years ago the Defense Department foresaw a drop to $1.5 billion a year or less in fiscal '55, '56 and '57. Instead, military construction spending moved up to where it had been in fiscal 1953, the top year of the Korean buildup.

Speedup and expansion of military programs accounted for most of the increase. Decision to raise Air Force strength to 137 wings by 1957 gave military construction a boost. The push for radar and anti-aircraft defense added to the volume. Now the swing to long-range jet bombers and Navy facilities for both aircraft and big carriers promises to keep construction rolling at a high level.

Reducing the government outlay for defense—the biggest item in the federal budget—has been a major objective of the Administration. And actually deep cuts have been made in overall military expenditures since the end of Korean hostilities.

Money savings have come largely through reduction in armed forces personnel. Defense planners have put the emphasis on advanced weapons systems rather than manpower as the chief deterrent to armed aggression. This shift has called for additional facilities not only to support the new striking power but also to protect it and the nation's vital centers against annihilating attack. As a result, construction now takes about 5½% of current defense budgets, as compared with less than 4½% of the bigger sums that were being spent when the present Administration came into office.

While their construction spending stayed up, the military services have made big cuts in the total of unobligated funds carried over from year to year. A flood of appropriations during tense Korean days left the armed forces with unobligated balances totaling $3.25 billion at the end of fiscal '53, six months after Eisenhower took office. By June 30 of this year, these balances had been brought down to less than $1 billion.

But Eisenhower this week showed his resentment against actions by Congress to horn in on what he considers strictly executive decisions. He vetoed the $2.1-billion military public works construction authorization bill, because of a provision which forbids the Secretary of Defense to spend any funds voted for sites for the Air Force Talos anti-aircraft missile until his decision is approved by the Armed Services Committees of both houses. Eisenhower said this procedure "would destroy the clear lines of responsibilities which the Constitution provides."

Immediate reaction from Congress was to pass the bill again without the objectionable language. The new bill would in effect authorize sites for the Talos weapon, thus letting Secretary of Defense Wilson decide how to go ahead.

▶ Stream Pollution

The Administration and Congress combined this year to step up the fight against stream pollution. The law: (1) is a permanent anti-pollution measure with no termination date, (2) strengthens somewhat the powers of the federal government to bring an offender into court and (3) authorizes $500 million worth of grants-in-aid to cities over a 10-year period for building sewage treatment plants (ENR July 5, p. 28).

Enforcement of the new law's tougher provisions still remains primarily a state function and responsibility, with federal action stringently limited to a last recourse position.

The Surgeon General can bring his enforcement powers into play only when pollution is injuring a state other than the state in which it originates, and only after the latter's pollution control agency has been encouraged to clear up the pollution. If the pollution persists, the Surgeon General can step in on a request from the pollution agency or governor of the injured state.

From then on, he must follow a complicated and time-consuming procedure.

▶ Water Resources

After a partial holddown during the first two years of the Eisenhower Administration, water resources development has made a strong comeback. At the start, the new Administration held a tight rein on new projects as part of its effort to reduce spending and balance the budget. The Republican-controlled Congress of those years gave fair cooperation.

In the last two years, however, there has been a resurgence of project proposals. The Administration relaxed its economy restraints and Congress, now under Democratic control, went along wholeheartedly with the requests and added projects of its own that more than doubled the total.

In all, starting money has been voted at the last two sessions for new water projects that will cost something like $4 billion to complete. Eisenhower has made no attempt so far to block use of appropriated funds for starting any of these new works, including those added by Congress. There is little likelihood that he will impound money voted for any new water project.

These additional starts will increase construction expenditures in the coming years. Spending on water projects has declined steadily during the Eisenhower Administration mainly because of the decrease each year in the amount required for continuing work on jobs under way. Money for continuing work represents the bulk of the annual expenditure. With a number of big new projects getting started, funds for continuing work are expected to go up.

• **Corps of Engineers**—Restrictions on new starts reduced the backlog of uncompleted work on flood control and navigation projects by about $1.3 billion during the first two Eisenhower years. New projects approved since then, however, promise to build up the backlog more than $2.5 billion to a total exceeding $4 billion. This increase should step up the civil works construction program of the Corps of Engineers. Annual construction expenditures dropped to about $400 million in fiscal 1955 but have already started to rise.

Disastrous floods last year and able handling of recovery operations by the Army Engineers have focussed attention on their flood-control work. As a result, the Corps has been able to revive and speed up flood-control projects in the Northeast and other parts of country.

• **Bureau of Reclamation**—New authorization and project starts have given a tremendous boost to the Bureau of Reclamation in the last two years. After a slowdown during the first part of his term, Eisenhower came out in support of new projects, including the huge Upper Colorado River development, that led to authorizations totaling some $1.2 billion. And Congress voted starting money to begin construction of projects costing at least $1 billion.

In addition, the President is backing the $160-million Fryingpan-Arkansas development, which still has some chance of authorization at this session. For the future, the Administration has under study a plan for use of pooled power revenues to open up the Columbia River Basin to vast irrigation development.

All in all, the liberalizing of Administration policy on reclamation has lifted this phase of federal construction activity out of the doldrums and put it on a solid base.

▶ Partnership Projects

From the start, the present Administration made it a policy to encourage local development of natural resources. One direct result was a big increase in applications to the Federal Power Commission from private power companies and some publicly-owned local utilities for licenses to build on hydro sites.

In addition, the Administration invited local interests to share the cost of federally-authorized projects. In some cases, a local company or public agency may build a project in accordance with federal requirements. On such a project, federal money may be contributed to cover flood control or other costs that yield national benefits.

Under another plan, the federal government builds the project and local interests pay the cost of power or other revenue-producing features. In return, the local investors get rights to the power output of the project for a long term of years.

Projects of the first type have made the only real progress to date. Three have advanced to the construction stage: the Coosa River dams in Alabama, Markham Ferry Dam in Oklahoma and the huge Priest Rapids project on the Columbia River in Washington.

▶ Lease-Purchase

Congress and the Administration opened a new field for private construction of federal buildings in 1954. Under so-called lease-purchase legislation, enacted that year, the government is able to take competitive bids from investor-builders for erection of buildings designed to federal needs. The government pays for the buildings on the installment plan, like rent, and acquires title at the end of a contract period, usually 25 years.

Construction contracts have now been awarded to investor-builders for the first lease-purchase projects. Additional contracts will be coming out steadily for some 50 approved buildings on which designs are completed or nearing completion. These projects scattered throughout the country, involve a total cost approaching $150 million.

Bulk of the lease-purchase construction is handled by the General Services Administration.

▶ Schools

Even this week the Administration, with President Eisenhower personally active, is trying to get the Senate to revive an almost dead federal school construction program. Chances are almost nil that the effort will get anywhere. Senate leaders see no way of overcoming the sentiment of the House of Representatives that first, voted a non-segregation amendment into the legislation, and then defeated the entire bill. The combination of Southerners opposing non-segregation and conservation members opposing federal entry into the nation's school problems—even in construction—is too great to reverse at this late date.

Certainly, the issue will be a big one in the coming Congressional and Presidential campaigns.

In the other school program the federal government does engage in—aid to areas in which there is an inordinantly great impact of federal military and civilian employment—grants for construction and maintenance of schools will go up this year and next. Federal aid for construction is expected to go from last year's $140 million to $146 million in fiscal 1957 and the same in 1958. Additionally, money for maintenance and operation will go to $113 million in fiscal 1957 and $119 for fiscal '58.

Upper Colorado

$460 million worth of work due to be let by next spring

All major contracts will be let for the Upper Colorado's $460 million Glen Canyon Dam by early next spring, according to the U. S. Bureau of Reclamation.

Glen Canyon is a key feature of the Colorado River storage project, for which Congress has voted $13 million. The dam at Glen Canyon will be a 700-ft high curved gravity concrete structure. It will have an 800,000 kw power plant operating under a mean head of 480 ft. The 26,000,000 acre ft Glen Canyon Reservoir will rival Lake Mead at Hoover Dam in size.

Here is the timetable for initial work:

Permanent bridge across the Colorado and 20 mi of access road—contract to be let in late August or early September by Denver office. Bridge, to have span of 1,200 ft, probably will have four vehicular lanes that will connect with north-south highway between Utah and Arizona.

Diversion tunnels—The project will have two 2,700-ft, 50-ft dia diversion tunnels. Bids for the first, on the right abutment, will be advertised in August or September by the USBR chief engineer's office in Denver. Later—probably early next year—bids will be called for the second tunnel together with a cofferdam that will rise 100 ft above river level. This will set the stage for bid calls on the dam proper.

Roads—Bid call already has been issued on 5 mi of access roads east of the dam, and bids were submitted July 3 for exploratory drilling at the dam site.

Housing—Contract for part of the temporary housing will be let in August.

At Flaming Gorge, Wyo. a $65-million project included in the Colorado storage project, exploratory drilling is under way. One of the first contracts, a 17-mi temporary access road, will be let soon.

Bill Would Reconstitute Louisiana Highway Board

A bill that would reconstitute the Louisiana Board of Highways has been signed by Governor Earl K. Long. Before the measure can take effect, however, voters must approve in November a constitutional amendment that would abolish the existing board.

As set up under former Governor Robert F. Kennon, the existing board has members who serve overlapping terms of office. Under the new system provided in the new bill, the Highway Board would be composed of a member of the legislature to serve as chairman, and one member from each Congressional district, all appointed by the governor to terms concurrent with his own.

First N. Y. Heliport

Temporary facility to set pattern for future service

Construction of the first commercial heliport to be located in the heart of Manhattan got under way last week at a bulkhead site on the Hudson River at West 30th St.

A Port of New York Authority project, the $320,000 heliport will be a temporary facility. Operational experience gained in serving PNYA's three major airports—LaGuardia, New York International and Newark—will be the basis for developing a permanent heliport at West 30th St. and at other locations. Initially, only cargo and mail will be shuttled between the heliport and the three airports. Passenger service will be started shortly thereafter.

The heliport, which is scheduled for completion in three months, will be located on a strip of land 70 ft wide and 400 ft long, paralleling the bulkhead line, and extending over the water. It will have two 40 by 80 ft touchdown pads of reinforced concrete supported by steel piles; a helicopter parking area 50 by 50 ft; and a 20 by 40 ft terminal building.

Pile driving began last week under a $93,567 contract held by George W. Rogers Construction Corp. of New York City. Bids for other work are now being solicited.

PNYA also started work this week on the $7-million, three-berth Pier 11 on the eastern shore of the Atlantic Basin. To be the longest facility for berthing vessels on the New York City waterfront, the 2,100 ft long, 270 ft wide quay-type structure will be the first new pier under an $85-million Brooklyn-Port Authority pier development program. Work has begun under a $3.4-million substructure contract held by Fehlhaber Corp. of New York City.

In addition, PNYA has announced plans for a $6-million, three-berth terminal and a $1.6-million cargo terminal building at Port Newark, N. J. This will bring to $40 million the amount spent by the bi-state (N. Y.-N. J.) agency since taking over the area in 1948.

Virginia Tunnel

Norfolk and Portsmouth give two site preferences

By a process of elimination based on traffic and economic considerations, two Virginia cities last week had narrowed down to two possible locations for a second Elizabeth River tunnel from Norfolk to Portsmouth.

One route would run from Colley Ave., in Norfolk, to Pinners Point in Portsmouth. The other would be from Claremont Ave., Norfolk, to Pinners Point. Neither would be parallel to the existing tunnel, because of anticipated terminal difficulties in Portsmouth.

Pinners Point is a finger of land projecting into the river, and is the site of terminals of the Atlantic Coast Line Railroad, and a large chemical plant. Norfolk city officials want a tunnel running to the northern side of the point, on the premise that such a location would tie better into Norfolk's extensive redevelopment plans. Portsmouth officials would rather the tunnel went to the south side of the point, so as not to eliminate valuable pier space.

Either route, however, would support a $45-million bond issue, according to Walter A. Barry, of DeLeuw, Cather & Co., traffic survey engineers for the commission. The $45 million would include a re-issue of bonds of the existing tunnel.

Eliminated from further consideration, in addition to a parallel tube, were: a direct route from downtown Portsmouth to downtown Norfolk (too much additional traffic in congested areas); a tunnel from Bute and York Streets in Norfolk to Pinners Point (possible interference with the Portsmouth Naval Hospital); and from Orapax Ave., Norfolk, to Pinners Point (too expensive).

Rising Cost Estimates Dim Future of Cleveland Subway

Estimated costs of a downtown loop subway for Cleveland have now risen higher than the $35-million ceiling set by a county bond issue.

County Engineer Albert S. Porter, who has been checking cost figures submitted by consulting engineers, said that the changes needed in storm and sanitary sewers affected by the subway construction would raise the cost of construction of the loop subway to $35.4 million.

Observers felt that with this new charge against the proposal, that the entire project may be held in abeyance or abandoned.

Who's Responsible?

Cave-in deaths bring suits and city-state controversy

The tragic deaths early in June of six children who had been playing in a Brooklyn construction excavation, last week erupted into two lawsuits and a hot controversy between New York City and New York State.

The excavation—in a heavily populated area—was part of an expressway now under construction. The children were killed in an earth slide as they dug into the slide slopes (ENR June 28, p. 100). Last week, the father of one of the children filed suit for $500,000 damages against the state, city and contractors; parents of a second child filed additional suits for an undisclosed amount.

While these actions were going forward, a city-state controversy erupted between Jacob K. Javits, State Attorney General, and the city's many-hatted Robert Moses—speaking in this case in his capacity of City Construction coordinator.

Javits had concluded an investigation of the accident by releasing a public statement calling for changes in the city's construction code, and disclaiming state liability on the ground that:

(1) The property in question had been purchased by the city, and not yet turned over to the state.

(2) State contracts do not place responsibility on the state to supervise —among other matters—safety precautions taken by the contractors.

Moses in reply issued a characteristically blistering statement calling Javits' report "irresponsible" and pointing to provisions in state contracts that provide that the contractor must submit for approval to the district engineer an outline of "his proposed methods and manner of executing the work, including sequences of operation . . . work under all items in the contract must be carried out to meet these field conditions to the satisfaction of the (state) engineer and in accordance with his instructions. . . ."

"Why in the world," commented Moses, "would provision be made for expenditure by the state of vast sums of . . . money for supervision by the state of this contract work if not in accordance with the obligation of the state to completely and adequately supervise the work?"

The four construction code changes recommended in the attorney general's report were:

- That future contracts include requirements for sufficient and competent watchmen.
- That the city's building code be revised to require mathematical sloping of the sides of excavations to prevent slides.
- That watchmen be required on all excavations.
- That better cooperation be achieved between contractors' watchmen and local police.

Fire Has Deep Effect

Water used in firefighting causes subway damage.

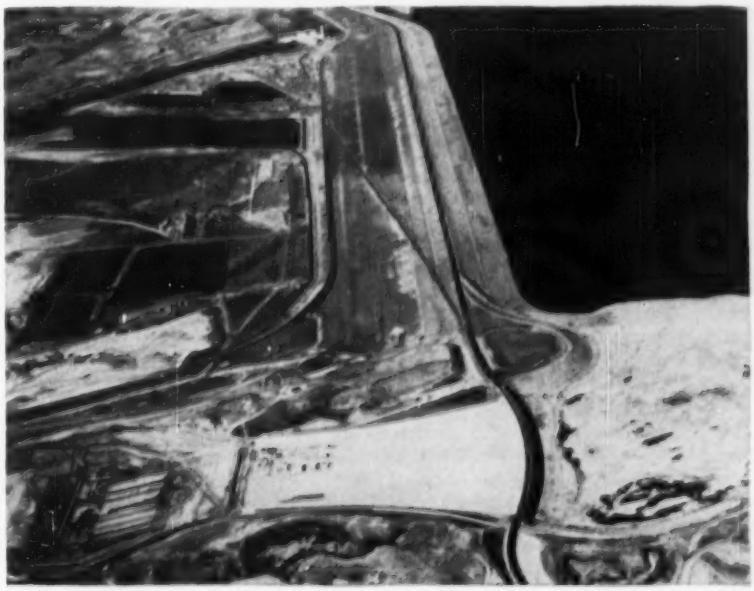
A 25-hour fire in an abandoned store building in downtown Manhattan last week temporarily knocked out nearly half of New York City's underground transit system—and posed a major engineering problem that may keep at least one of the affected subway lines out of service for many days.

The fire occurred in a building at Ninth St., between Fourth Ave. and Broadway, which was formerly occupied by John Wanamaker's major downtown store. Abandoned, the building was being demolished to make way for a housing project.

The stubborn blaze, however, caused firemen to use so much water that the result was a flood of the Astor Place subway station, immediately below the old store building, and flood waters seeped into a nearby subway line and shut it off as well. By mid-week, however, the BMT Broadway line had been restored to service, as water was pumped out.

Most serious damage was to the IRT Lexington Ave. subway—a four-track line at Astor Place. Water from the fire apparently seeped down the outside of the underground concrete box that contains the subway line, and washed out earth that underlay the base slab of the box (the subway was built by cut-and-cover methods). The bottom slab—on which ties and rails rested directly—fell into a washout at least four feet deep, leaving three of the four tracks, ties and electrical equipment hanging free in the water.

Transit Authority engineers feared further that a row of steel columns that support the street above the subway line had been undermined, and that all the columns in a section about 200 ft long would have to be underpinned before the tunnel and the street above it could be considered safe.



Finishing Touches Given to Garrison Dam

With its 70-million cu yd rolled earthfill impounding water and three 80,000-kw generators in its powerhouse already turning out some power, the Corps of Engineers' Garrison Dam on the Missouri River in North Dakota begins to look like a completed project. But finishing touches will take most of the rest of the year. These are largely concentrated in the great generator room of the powerhouse and on the spilling basin in the foreground of the above view where Peter Kiewit Sons Co. and Morrison-Knudsen Inc. are busy concreting the slab and walls.

The slab, 5 ft thick, will require 210,000 cu yd. It joins the more gently sloping spillway chute, itself a slab 3,200 ft long and 1,336 ft wide at the upper end over which a maximum discharge of 827,000 cu ft of water per sec can pour.

With 17 precedents over 30 years, there's yet . . .

Another State to License Contractors

Louisiana this week became the 18th state requiring some sort of licensing for contractors doing business within its borders.

Under sponsorship of the state Associated General Contractors chapter, the new measure went through the legislature with little visible controversy, on the strength of AGC's comment that it won't "build a fence" around the state but rather would "upgrade the profession." Licenses are required for contractors bidding on jobs in excess of $30,000.

With some state contractor licensing laws now more than 30 years old, the subject has long been a matter of serious controversy within the construction industry with proponents generally contending that the laws enforce responsibility on the construction industry and opponents arguing that the tendency is to make closed corporations out of specific areas. Particularly since the end of World War II, much pressure for such laws has resulted from the activities of the comparatively few shoddy homebuilders—but only one of the state laws now on the books (Michigan) is aimed specifically at homebuilders.

A check by ENR's correspondents in the other 17 states where such laws are in effect, last week produced about equally divided sentiments among construction industry representatives—many objecting particularly to provisions requiring submission of financial statements to examining boards made up of competitive contractors; those in favor citing easier control of shoddy operators.

• **Louisiana on bandwagon**—As enacted, Louisiana's new law reestablishes a board that was abolished in 1950. Seven board members—each of whom must have had at least 10 years of contracting experience—will administer the law. Their first move is to be preparation and publication of a roster of all licensed contractors in the state—granting licenses first to firms that were licensed under the previous act, after receipt of financial statements and payment of new fees. Other applicants will be examined and licensed subject to regulations to be promulgated later.

Specifically exempted are private residential builders; architects and civil engineers; contractors bidding on federal-aid work (who must obtain licenses, however, before starting work); and public utilities.

One important provision: The board is to classify contractors according to type or types of contracts on which they may bid, and, after classification, the licensee is not to be permitted to "bid or perform" a type or types of work not included in his application. The law states, however, that the board does not have authority to "determine, fix or suggest" the amount of a contractor's bid limit.

• **Old story**—Contractor licensing laws (other than those controlling specialty trades such as plumbers and electricians) have been on state books for at least 30 years, since Utah passed its control law in 1926. One state—Florida—requires licensing, but the law is aimed at all business and applies equally in the Sunshine State to shoe stores, soda fountains and contractors, who may be required to have licenses both from the state and from a city or county.

With some exceptions, the laws have some similarities:

All but three (Delaware, Montana, North Dakota) have special licensing boards to administer the law—all of which are composed of men with required contracting experience. (The three states mentioned handle licensing through existing state departments).

Five of the states do not require a financial statement as a prerequisite for licensing, 12 require such statements.

All states set monetary limits on the type of work for which a license is required of the contractor. The range of these limits extends from $100 and up (California) to $200,000 or more (Virginia).

All states provide monetary penalties for failure to comply with the laws, and all provide machinery for hearings, investigation and prosecution of violators.

One state—Michigan—aims its law specifically and entirely at homebuilders, requiring licenses for residential construction in counties with populations of 300,000 or more, or where voted upon by county authorities.

Most states exempt public works that involve federal money from licensing provisions.

Contractor Licensing Laws

ARIZONA: License required of all contractors.
ARKANSAS: License required for projects of $20,000 or more.
CALIFORNIA: License required for general and subcontractors on work of $100 or more.
DELAWARE: All contractors must have licenses.
FLORIDA: Occupational license required.
IDAHO: License required for bidding on public works.
MICHIGAN: On residential building only, in counties of 300,000 or more.
MISSISSIPPI: License for projects totaling more than $3,000 at any one time.
MONTANA: License required for all public work.
NEVADA: License for all contractors.
NEW MEXICO: License for all contractors.
NORTH CAROLINA: License for work over $20,000.
NORTH DAKOTA: License for public work over $2,000.
SOUTH CAROLINA: License for all work $12,500 or over.
TENNESSEE: License for work over $10,000.
UTAH: License for work over $200.
VIRGINIA: License for work over $200,000.

• **Opinions: Good**—Reaction to the laws and their administration is as varied as the states in which the statutes are effective, according to ENR's reporters.

In Arizona and California—two of the states with the oldest laws (1930 and 1929 respectively) support both from contractors and labor unions is on the enthusiastic side in a majority of instances. Arizona contractors say they are pleased with the strict enforcement (a Phoenix plumbing contractor recently was suspended for substituting lighter-grade pipe on a $4-million building), want the law tightened to include contractors on federal work.

California, with probably the biggest group of licensed contractors in any state (76,870) seems to get support from all sides. Its elaborate enforcement organization last year, for instance, examined 12,362 complaints—only 364 of which ended in disciplinary action.

Other generally unqualified votes of confidence come from Michigan, North Carolina, North Dakota, Tennessee and Utah.

• **Opinions: Maybe**—Qualified approval comes from other states: Mon-

tana, where contractors feel that the law is too much of a revenue-producing act and not regulatory enough, and where moves are afoot to put enforcement teeth into the statute, and South Carolina, where state officials are awaiting the reaction to an amendment requiring licensing for mechanical contractors.

Opposition is apparent in New Mexico, where contractors are complaining that the law as passed (1939) still enforces an obsolete building code; that enforcement is lax, particularly in rural areas, and that political pressures have been evident. In Mississippi, though large contractors generally are said to favor the licensing, small ones have opposed it bitterly on the basis of the requirement that they submit financial statements and that too much (specifically the state's multi-million school program) is excluded from coverage.

In Delaware, the law seems to be in the legislative doldrums. Licenses are now issued by the State Tax Department, but a move to appoint a licensing board has been stalled in the legislature for more than a year.

Idaho's law is in something of a special category, in that it is aimed at bidding on public works rather than at performance. Generally, contractors have gone along with it.

Florida also is a special case, in that its licensing provisions—according to some contractors particularly those from out-of-state—are so complex as to make it virtually necessary to obtain a new license each time a contractor moves to another part of the state even if it be within a few miles of his original operation.

On a national scale, the AGC takes no official position. It feels that its local chapters must handle the situation as they see fit in the light of local conditions.

A Man in a Boy's Job

Engineers hit wasteful use of the technically trained

Some pungent answers were given to the question of how to make best use of engineering personnel at a meeting of the Southern California Chapter, American Public Works Assn., in Los Angeles last week.

Plain-spoken Fritz Zapf, City Engineer of Monrovia, in criticizing the time lag in putting newly graduated engineers to responsible tasks, said, "The engineering profession is its own worst enemy; the oldtimer's concept seems to be that a man is not a finished product until he's ready to die." Zapf is all for sending a boy out to do a man's job, commenting, "He'll get to be a man a lot quicker that way."

Management consultant William R. White of Booz, Allen & Hamilton, classified as "something out of the Dark Ages" the idea of a lengthy apprenticeship at routine tasks.

Fred S. Lohman, chief deputy city engineer of Los Angeles, reported his office had discovered an "amazing amount of time" spent by professional engineers on non-professional jobs. After a thorough reshuffle, clerical personnel now perform much of the budgetary and statistical functions formerly done by engineers.

Development of standard unit cost tables and equations has enabled Pacific Telephone & Telegraph Co. to divert much cost estimating to clerical employees, said Thelma Randall, assistant engineer with PT&T. Consultant White offered another utility's experience along the same lines, but city engineers Zapf and Lohman questioned this application of standard equations in municipal public works departments.

After the panel explored the importance of giving engineers varied work assignments, small-city man Zapf concluded, "We love those large cities that concentrate on high specialization—we get their manpower!

The Steel Strike

Impact begins to be felt, the worst is yet to come

The steel strike's full impact on construction began to show up this week, in a few areas. Unless a settlement is reached within the next few days, which seems unlikely, the effects on construction will be widespread. And, if the strike lasts through July, work will be halted at the steel erection stage in virtually every area except the West Coast.

Unlike some other industries, construction was unable to build inventories in anticipation of the best-publicized steel strike in the nation's history. Structural steel deliveries were running six months to a year longer than normal before the strike began. The steelworkers' wage walkout will add a minimum of two months to the pre-strike delivery schedules.

So far, supply of reinforcing bars has held up fairly well, but a few cities already are in trouble and others expect serious shortages of reinforcing bars to develop within the next week or two.

• **South hit hardest**—The steel strike has had its most damaging effects in the South because it comes on the heels of a shutdown of Tennessee Coal & Iron, a subsidiary of the U. S. Steel Corp., that has been strikebound ever since April.

With this source of supply knocked out during the two months just prior to the current general strike, the South is scraping the bottom of the barrel for structural steel, and supplies of reinforcing bars are lower than elsewhere.

No new starts are reported in Birmingham on projects that require steel, although contractors have enough steel to complete work under way.

A similar "no new starts" situation has developed in Atlanta. If the strike goes to the end of July, work on Atlanta's expressways will be delayed and there is a possibility that there would be widespread design changes to use concrete instead of steel.

• **Midwest jobs slowing down**—The outlook in the Middle West is dark. Some Cleveland jobs already have been slowed because they lack the steel needed. A few jobs have been delayed in Cincinnati and some Minneapolis projects have been curtailed.

Some Boston projects are being held up because of the scarcity of steel; another week of the strike and all sizable jobs in the Boston area will be halted in the steel erection stage.

Jobs in the New York area have not been affected by the strike yet.

Some Denver jobs face slowdowns, but on the West Coast, the situation is comparatively bright. The reason is that Kaiser Steel is still operating; it's wage agreement with the steelworkers runs until Aug. 31. But Kaiser cannot supply all the required West Coast steel by itself. If the strike continues until the end of July, some projects may be halted in the Los Angeles and Seattle areas.

Suit Asks End to Licensing of Highway-Borne Earthmovers

The Central Pennsylvania Quarry, Stripping and Construction Company of Hazelton has filed suit in a Harrisburg court asking that the state be restrained from requiring licensing of earthmovers and other heavy construction equipment on public highways only to move from job to job.

The suit was an outgrowth of a ruling by the State Attorney General that requires such oversized equipment to be licensed as trucks—at fees ranging from $225 to $300 a year for using the highways. The Hazelton company said the ruling would cost it up to $24,000 a year for Pennsylvania license tags alone.

Previously, special permits were issued by the state for highway movement of such vehicles.

Tunnel, Waterway

Louisiana votes money for two construction projects

Louisiana's legislature has appropriated $14 million for construction of a tunnel under the Industrial Canal in New Orleans. The tunnel will parallel an existing bascule bridge.

A new ray of hope from Washington led the legislature to take steps to gear the state for the possibility that a long-proposed 205-mi ship canal from the Mississippi River at a point about 50 mi above Baton Rouge to Shreveport may yet be built. The project is designed to make Shreveport an inland port.

The proposed canal, which would parallel the Red River and be known as the Overton-Red River Waterway was authorized by Congress 10 years ago but not until this session was any money voted for planning. This year's appropriation bill gives the Corps of Engineers $150,000 to prepare an up-to-date economic justification for the project.

Proponents of the project say the canal is necessary to the industrial development of Shreveport area. Opponents say the plan is too expensive—estimates ranging from $125 million to $200 million—involves too much roadway and bridge replacement, and that the money should be used to make the Red River navigable.

What the legislature did was: (1) To prepare a state constitutional amendment for November referendum empowering the legislature to create an Overton-Red River Waterway and Port District; and (2) to authorize, upon adoption of the amendment, the establishment, operation and maintenance of the waterway and creation of an Overton-Red River Waterway and Port Commission. Among other objectives such machinery is necessary to provide the state's share of construction costs.

• **New contracting policies**—The legislature dealt with a number of matters affecting the construction industry at this session, including passage of a contractor licensing law (see page 26).

Parish authorities were empowered to contract for highway and bridge design work, providing the State Highway Department is unable to do it, on projects to be constructed out of parish royalty road funds (special fund in which state deposits for each parish 10% of royalties the state receives from mineral leases granted on state-owned property located in the parish).

A constitutional amendment was proposed which would require that the state's 10-year tax exemption plan for industries shall not apply to school levies.

ASCE Announces Honors

The American Society of Civil Engineers has announced names of five elected to honorary membership, the Society's highest distinction:

George W. Burpee, senior partner in Coverdale & Colpitts, New York consultants;

Prof. Albert Haertlein, associate dean of engineering and applied physics, Harvard University;

Maj. Gen. Thomas M. Robins, retired from the Corps of Engineers and active in consulting in Portland, Ore.;

Ole Singstad, partner in Singstad and Baillie, New York consulting firm;

Prof. Ralph B. Wiley, retired head of the School of Engineering at Purdue University.

Honorary membership will be bestowed upon these five on Oct. 17 at ASCE's national convention in Pittsburgh, Pa.

Tollroad Shift

Part of Ohio pike No. 2 earmarked for interstate

The initial move has been made to make 116 mi of Ohio's proposed 385-mi Turnpike No. 2 (Cincinnati-Conneaut) into a federal-aid interstate highway project.

Expenditure of $525,000 in state funds toward preparation of engineering plans has been authorized by the Ohio Highway Construction Council. The figure represents one-tenth of the design cost and is predicated on approval of the 116 mi of highway as part of the interstate system, which is eligible for federal aid on a 90-10 matching basis.

The 116-mi program includes 82.3 mi from Conneaut in northeastern Ohio to Turnpike No. 1 south of Cleveland and 34.2 mi from Cincinnati's Millcreek Expressway to Ohio Route 741 south of Dayton. Traffic studies had indicated that these sections would not be financially feasible at this time (ENR June 14, p. 28).

As Ohio geared itself to take all-out advantage of the new federal highway aid bill, State Highway Director Samuel O. Linzell was insisting that city expressways linking the interstate system be given priority. Cities were being advised to approve bond issues this November to raise their share of matching funds.

The state has $227.3 million in interstate highway projects already to go as soon as federal funds are doled out.

Pollution Curbed

ORSANCO sees progress in cleaning up the Ohio

Eight years after its establishment, the Ohio River Valley Water Sanitation Commission reports that 75% of the sewered population in the area is now served by sewage treatment facilities.

At last week's annual meeting in Cincinnati prime topic discussed by the eight member states was the probable effect of the grants-in-aid provision of the Federal Water Pollution Control Act just signed by President Eisenhower (ENR July 5, p. 28). Consensus: Little influence in the Ohio Valley.

Chairman Lloyd offered one good reason for a city not to delay works construction in the hope for federal aid: The continued upward spiral of construction costs would make for increases probably greater than the amount of federal aid for which many communities might be eligible.

Primary focus of commission attention these days is industrial waste pollution. Of 1,438 industries discharging effluents directly into streams of the Ohio Valley, only half of them have provided adequate control facilities.

Corrective works for many of these industries await formulation of comprehensive control programs for chlorides, phenolic substances and "hardness" constituents. Studies on such programs are in well advanced stages at the present time.

State Highway Department Gets Oklahoma Pike Plans

The Oklahoma Turnpike Authority will turn over to the State Highway Department its engineering plans for 100 mi of four-lane highway, which was to constitute a tollroad link between the dead-end Kansas Turnpike south of Wichita and Oklahoma City.

Decision to make the project a free highway came as prospects for financing the route as a tollroad faded with passage of the new federal highway aid bill. The tollroad would parallel U.S. 77, which is part of the interstate system.

Oklahoma, like Pennsylvania (ENR July 12, p. 17), is preparing to ask the Bureau of Public Roads to designate as interstate highways its three-year-old 88-mi Turner Turnpike, connecting Oklahoma City and Tulsa, and its 90-mi tollroad now under construction from Tulsa to Joplin, Mo., which is due to be opened before July 1, 1957. If acceptable to BPR, federal aid funds would be used to retire outstanding bonds.

At Atlanta conference, highway men are told of . . .

New Uses for Electronic Computers

The electronic computer bandwagon picked up speed last week. No less than 240 highway men converged on hot, sticky Atlanta, Ga., to attend the third regional conference featuring the high-speed calculators.

Through panels and computer demonstrations by four manufacturers, conferees gained an insight into computer operation, heard progress reports on the latest applications and, more importantly, were given the facts of life concerning fitting a computer into their own operations. In between were sandwiched many good points on improving highway engineering productivity in general.

• Why Computers?

Electronic digital computers are being pushed as the major weapon to be employed by highway men in their battle to save planning and design time and to reduce required engineering manpower (ENR July 12, p. 30). For example: Users report that with computers the total time to obtain design earthwork quantities (from receipt of field information to printing of final information) averaged between 2½ to 3 man-hours per mile in contrast to 98 man-hours per mile required for normal planimetering and calculation. Further, Arizona reported the production of its computation department up by 100% to 150%.

One speaker, however, T. F. Morf of Illinois, ventured that the greatest savings possible with computers are not in manpower or time but in the actual reduction of earthwork quantities through more efficient grade and alignments resulting from the ability to make numerous trial runs with the computers.

• Where Do They Fit in?

Calculation of design and pay earthwork quantities were held to be the bread and butter applications of electronic computers in highway department engineering. The computers also permit doing away with actual drawing of cross-sections. The Bureau of Public Roads and other proponents foresee the time when engineers and contractors may develop a mental three-dimensional picture when reading ground evaluations and road design information for a particular cross-section, leading to the reduction of drawn cross-sections in final plans to one every few thousand feet or so.

Computers also are being utilized regularly by a few states for traverse closure calculation, conversion of rod readings to elevations, computation of grade line elevations and computing of haul diagrams.

Programs are being or have been developed for computing clearing and grubbing areas, borrow pit volumes and tabulating and evaluating contractors bids by carrying out unit prices, comparing with estimates and computing over and underruns.

Electronic computers have also been employed successfully in traffic density studies, in computing beam and cover plate sizes for a continuous highway bridge with three unequal spans and in analyzing rigid frame structures by the plastic method.

Investigation is under way in utilizing electronic computers in water runoff calculations and in modification of the ENGINEERING NEWS-RECORD pile driving formula.

• How Do They Fit in?

Some manufacturers advise prospective customers to start using a computer if they really want to find out what one can do. The experience of some present users trends to give substance to this advice in that they have reported a host of variations and improvements that they have worked into the computer programs they employ. Manufacturers and users are agreed that the very first step for interested agencies is to send a few likely computer experts from their own organizations to one of the programming schools that are run by all manufacturers.

Several highway departments reported establishment of a central computing section to handle engineering work from all over the state. None had any plans to disperse smaller machines to various districts in a state; however, a number of users are sharing their machines with non-engineering users (accounting, maintenance, cost control) within and outside the highway department. No clear-cut pattern of use has emerged, except that most computers are, and probably will be, rented rather than purchased outright.

The most important aspect of computer use is working up a set of instructions (a program) to guide the machine. For example, a program for computing earthwork quantities such as illustrated in ENR July 12, p. 30 involves about 1,000 instructions. If a programmer starts from scratch, he requires an average of one hour for each instruction, which includes analyzing the problem to be solved, writing the instruction and "de-bugging" the complete program. Of course, once obtained, the program is good for all time although to change the earthwork quantity program from use of rod reading information to actual elevations, for example, requires about one man-month of programming time. Thus, the programming factor will limit the utilization of certain applications of computers even where technically feasible.

However, the Bureau of Public Roads is attempting to ease the situation for prospective users by setting up standard programs. S. E. Ridge and L. E. Schureman of BPR foresee, in the case of the earthwork computation, perhaps four basic programs, each with several minor variations, as being sufficient to serve all states. They look to AASHO as the central computer program agency to handle receipts and distribution of programs between the states.

Two sessions at the Atlanta meeting where devoted to aerial photogrammetry and an upcoming marriage with electronic computers. Together the two design tools are held to save more time than the sum of savings from each alone. The ultimate in this combination is a direct connection between precision stereoplotters and electronic computers. The plotters read X, Y and Z coordinates of cross-sections directly from aerial photographs and these are transmitted to electronic computers in combination with road design data to obtain catch points and earthwork quantities.

• More Tips Offered

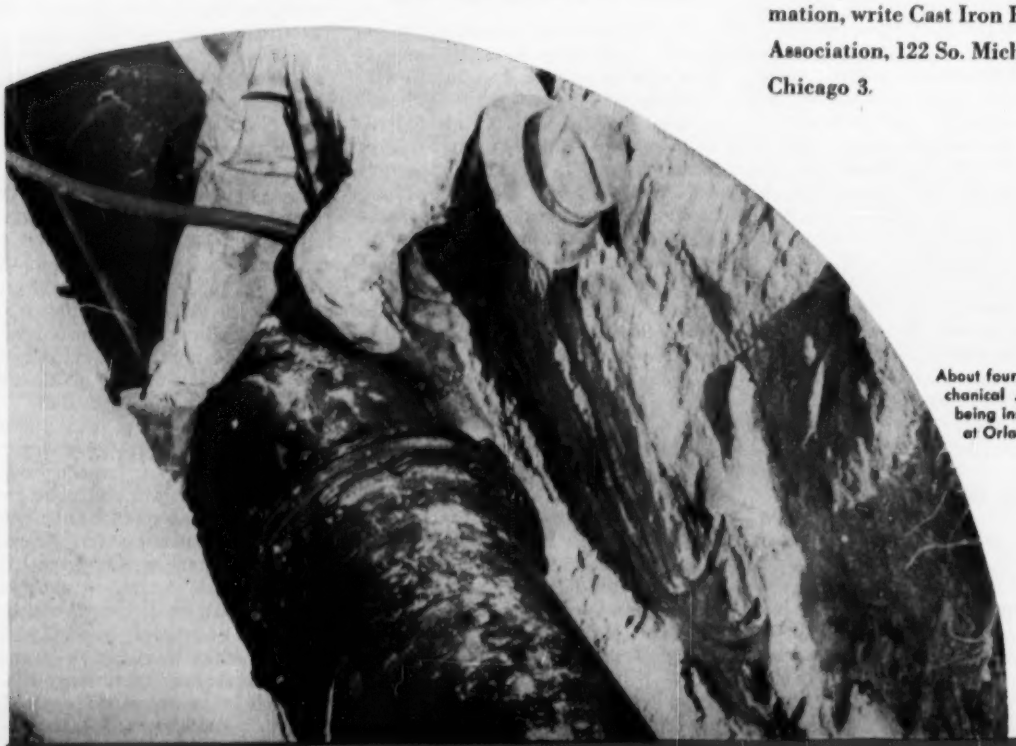
Though computers and photogrammetry hogged the spotlight at Atlanta, other significant ideas for increasing highway and engineering productivity were advanced. Among them:

- Pay contractors on the basis of accurately computed planned earthwork quantities to eliminate computation of final pay quantities.
- Include longer sections of highway in on contract.
- Bring allied professionals such as mathematicians into highway departments to enable highway engineers to concentrate on their own fields.
- Standardize on fewer approach angles for skew bridges over superhighways to allow more standardization of bridge design.

When you use it

Installing 6-inch Mechanical Joint cast iron pipe for pressure sewer river crossing to sewage treatment plant at Marquette, Mich.

If you were to put *your own money* in a pipeline that should be as nearly permanent as brains, hands and machines could make it, what pipe would you buy? Cast Iron Pipe, undoubtedly! And why? Because cast iron mains are in their *second century* of service in nearly *seventy* cities. *Modernized* cast iron pipe, as made today, is even tougher and stronger. Since everybody pays taxes, one way or another, everybody benefits when you install long-lived cast iron pipe. For further information, write Cast Iron Pipe Research Association, 122 So. Michigan Avenue, Chicago 3.



About four miles of 16-inch Mechanical Joint cast iron pipe being installed for water line at Orlando, Florida.

CAST IRON PIPE

everybody benefits!

Laying 16-inch cast iron pipe for water line to new Caterpillar Tractor Company plant at Decatur, Illinois.

Tieing-in 16" Cement-lined cast iron feeder main with 133-year old cast iron water main in Philadelphia.

Laying 21,000 feet of 6" to 12" cast iron pipe for water main extension at North Brunswick Township, N. J.

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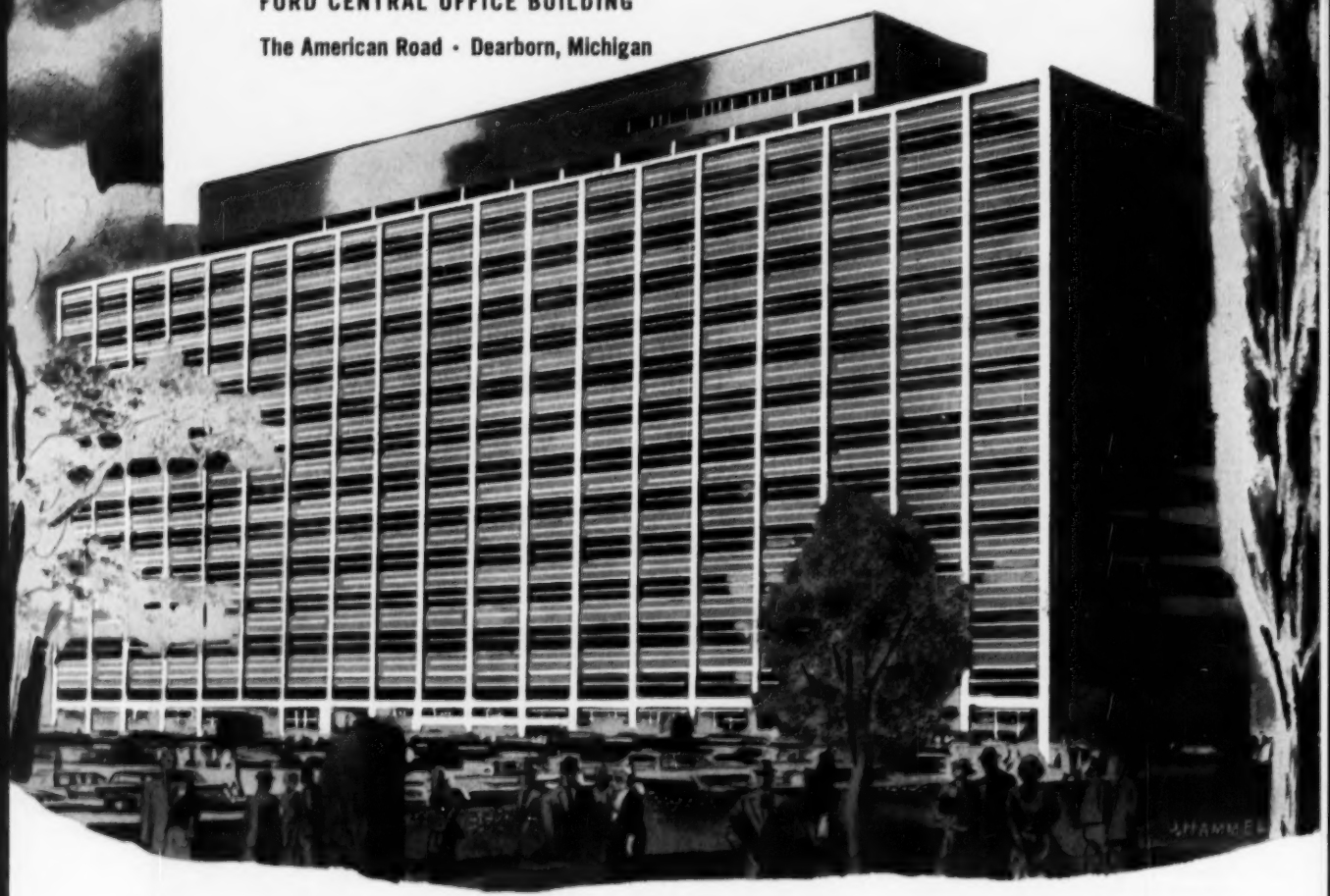

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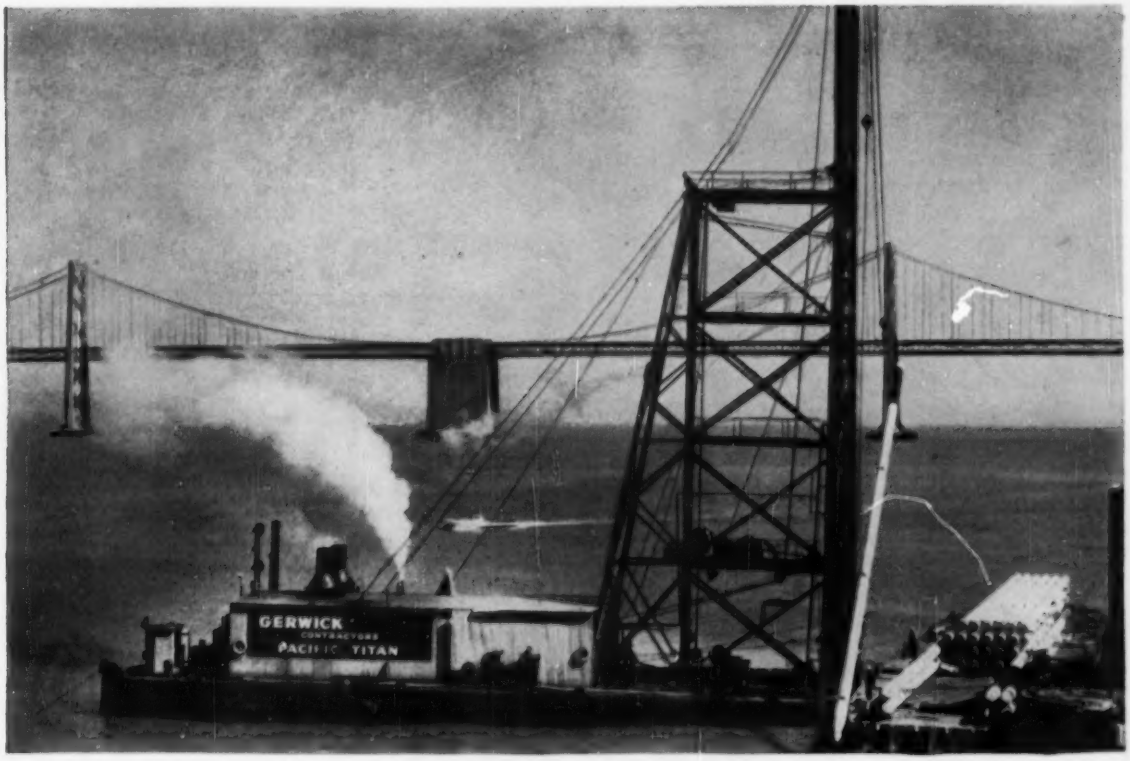


Pier modernization job on San Francisco waterfront includes record length units where . . .

Pretensioned Piles Are 132 Ft Long

More than 2,000 pretensioned concrete piles have been used on a pier modernization job on San Francisco's waterfront. And 139 of these are 131 ft 8 in. long—believed to be record length for pretensioned concrete piles. The remaining units are composite piles—the top 23 to 35 ft is pretensioned concrete, and the bottom is timber in lengths up to 104 ft.

The long piles have a 20-in. octagonal section. To save weight in handling, the units have an 11-in.-dia hollow core, except that 4 ft of the tip and 4½ ft of the butt are solid. Pretensioning is accomplished by 18 high-strength, stress-relieved wire cable strands of ½ in. nominal diameter in each pile.

The pretensioned part of the composite piles has a 14-in. octagonal section of solid concrete, and 11 cable strands are used. The lower end of the concrete portion is cast into a 13-in. ID, ¼-in.-thick pipe connector to provide a splice with the timber section. The pipe is 4 ft long lapping 2 ft over the concrete end portion and 2 ft over the timber pile.

• **Connects existing piers**—The new pier deck fills in a 190-ft-wide space between two existing 800-ft-long piers. Although this cuts the available berthing capacity from four ships to three, it provides more working space for handling material coming from and waiting to be loaded on ships. And it helps keep trucks servicing the pier off the waterfront street, and consequently reducing traffic congestion.

The major design problem faced by engineers for the State Board of Harbor Commissioners was to select the most economical type of piles to support the beam and slab concrete deck. To take advantage of the economy of timber piles, the engineers called for filling the space between the piers with mud. The imported fill material was brought up to 6 ft below low water level, leaving just enough water depth for floating pile driving equipment. This made possible use of composite piles on most of the work. And, to allow for possible future consolidation of the mud, the concrete portions of the composite piles reach 10 ft into the mud. Thus, the timber parts of the composite piles were protected from marine borers. Additional lateral support provided by the mud also enabled the designers to specify a smaller diameter unit.

In spite of the protection provided by the mud depth, alternate bids were called on three types of piles, namely: timber piles with gunite-jacketed tops; precast piles; and prestressed concrete-timber composite piles. The latter proved to be the most economical.

To hold the fill material in place, a 30-ft-deep underwater rock dike was dumped near the outshore end of the existing piers. Because it was feared that timber piles could not successfully penetrate this rock formation, the designers specified full length concrete piles in the rockfill area. Here, too, alternate bids were solicited with the choice being between ordinary reinforced, precast concrete piles and prestressed concrete piles. And the prestressed units came in at a cheaper figure.

• **Bay front casting yard**—Successful low bidder on the major part of the

. . . Casting the record piles

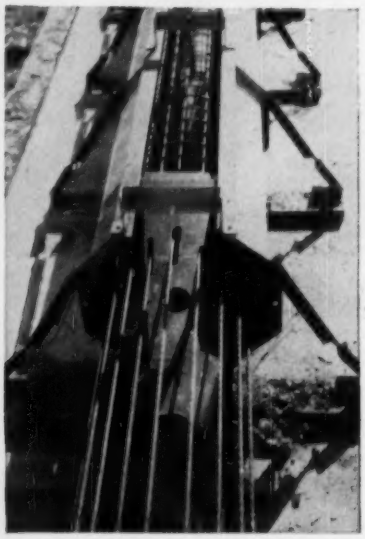
CASTING BED, 500 ft long, was used for more than 2,000 piles of which 139 had the maximum length of 132 ft. The remainder were composite wood-and-concrete units with the upper 23 to 35 ft being prestressed concrete.

pier modernization project—Ben C. Gerwick, Inc.—cast the piles at Petaluma, Calif. Although located some 50 miles from the job, the casting yard is on a tidal slough that makes barge transportation easy.

A permanent 500-ft-long pretensioning bed was constructed for this work, since the Gerwick organization plans on using it, as well as a more recently built 340-ft bed, for other pretensioned concrete work including bridge and building members. The 500-ft bed has space for four lines of piles. On each line the contractor could cast 16 of the pretensioned sections of the composite pile or 3 of the long pretensioned piles.

The piles were cast in specially built steel forms. The pretensioning strands were threaded through the entire 500-ft length of a line, and were stressed simultaneously by a mechanically powered 200-ton hydraulic jack. With design load figured at 11,200 lb, each strand was loaded to 14,000 lb (175,000) psi to allow for relaxation of stress through creep and plastic flow. Ultimate strength of the steel is 270,000 psi.

Concrete design called for a 28-day strength of 5,000 psi. And the concrete was required to develop 4,000 psi before tension on the strands could be released. This strength was developed fairly quickly by means of an



PRETENSIONING STRANDS are threaded through slots in the steel tip of the long piles. The 20-in. octagonal units are prestressed with 18 stress-relieved wire cable strands of ½-in. nominal diameter.

8-sack mix using a modified high early-strength cement and a 24-hr steam cure. Actual 28-day strength varied from 6,000 to 7,000 psi with at least 4,000 psi obtained by the 24-hr steam cure. This made it possible to drive piles as soon as 3 to 4 days after they were cast.

Due to their short length, the pretensioned portions of the composite piles could be handled by a 2-point pickup. But handling the 132-ft long piles was a different matter. In this case, number and location of pickup points had to be carefully selected to minimize bending moment. Even with the hollow core design, the long piles weighed 16½ tons each.

The contractor was aided in his selection of pickup points by a graphical method of analysis developed by Arthur Ezra, senior harbor engineer with the California State Board of Harbor Commissioners. This analysis, made a part of the specifications, is based on a rigorous mathematical solution of the stresses involved in lifting a long concrete pile with six or fewer pickup points. Had a non-prestressed pile been used on the job, a 6-point pickup would have been necessary. And even with the 6-point pickup some cracking of the concrete would have been expected. But the prestressed pile required only a 4-point pickup, and there was no distress noted in any of the piles due to handling.

Pickup points were located 9½ ft from each end, with another pair of points 36 ft further in. This left a 41-ft space at mid-pile. Two 60-ft-long slings of 1¾-in.-dia cable connected the two points nearest each end. Each

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COMMENT
from the
BUTLER ENGINEER

. . . of traffic tangles and racing 34E pavers

Overheard at the Ready Mixed Show:

"So you want me to cut my price? Look, this equipment will pay you a profit for years to come. I only make a profit on one sale — and you want to cut me out of that!"

•

The other day I drove from Waukesha to Milwaukee. Had to slam on my brakes to dodge a truckload of concrete block swinging out of a block plant (a Butler customer). In back of me (and he hit *his* brakes) was a transit-mix truck from a Waukesha ready mix outfit (another Butler customer). After I swallowed my heart I started to pass the block truck but had to swing back to avoid a transit-mix truck from Company Y in Milwaukee (another Butler customer). All right, don't believe this: booming along in back of Y's truck was another transit-mix owned by Z (another B-c-). Kind of a concrete traffic problem!

•

With the Butler 0-1-0 one-man-operated Roadbuilders' Plant I rather thought we had reached a pretty ultimate high for production. Now comes the idea of adding an aggregate bin for one size of stone (pre-set controls and automatically batched of course). Such a set-up would play ring-around-a-rosy with THREE 34E dual drum pavers.

•

Butler Automatic Batching (roadbuilders, ready mix or concrete products) will not do certain things. It won't

mix baby's formula
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but it will make you such a happy, handsome profit you can hire those jobs done.

Stay healthy, wealthy and you won't need to be wise

The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

sling was threaded through a running block connected to a picking line. Each such line was powered by a separate winch on the pile-driving rig.

• **Rig has 120-ft leads**—The piles were driven by a floating rig having 120-ft leads. The same rig was used to drive the piles for the piers of the Richmond-San Rafael Bridge (ENR Mar. 4, 1954, p. 30). For the long concrete piles, a 32,500-ft lb hammer was used.

One of the most interesting aspects of the work was that all piles were driven to predetermined elevations. This was possible because location of the sand and gravel strata, which supports the point bearing units, was known with a fair degree of accuracy. Years ago when the two existing piers were constructed, careful records were kept. And before the present job started, a row of timber test piles was driven down the middle of the slip.

Bearing capacity of the piles at the predetermined elevation was checked by the Engineering News formula. For the 1,839 composite piles, a 30-ton bearing capacity was required. Only 38 of these piles had to be driven below the set elevation, and 26 of the piles reached the bearing strength above the predetermined elevation (tolerance was 3 in. plus or minus). All of the long prestressed piles were driven to predetermined grade. At that elevation they developed 60 to 70 tons safe bearing capacity as compared with the design load of around 50 tons.

Rate of driving the long pretensioned piles varied according to conditions. Average driving rate was in the 5 to 9 piles per 8-hr shift range.

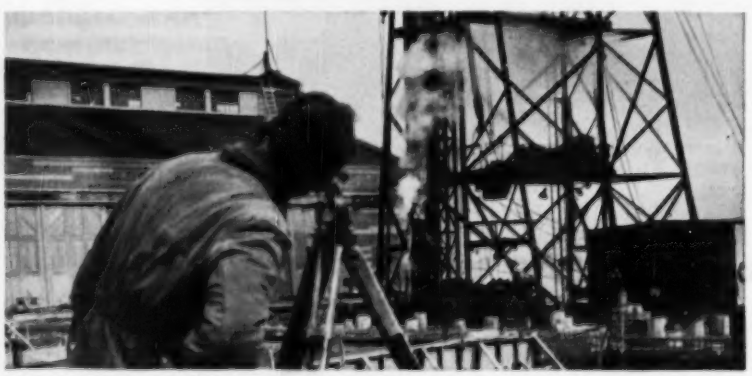
The pile bents are spaced on 10-ft centers. Composite piles are spaced 5¾ ft to 10 ft in the bent. Spacing of the long piles is 10 ft. within the bent except for the last two bents where the spacing is 12 ft.

• **Special test pile**—A sidelight of the driving work is a special lightweight test pile driven for the Division of Bay Toll Crossings of the California Department of Public Works. This Division is planning the Southern Crossing of San Francisco Bay, and data were needed on lightweight piles to see if they would be economical. It was also desired to determine if lightweight concrete is feasible for long, heavy piles.

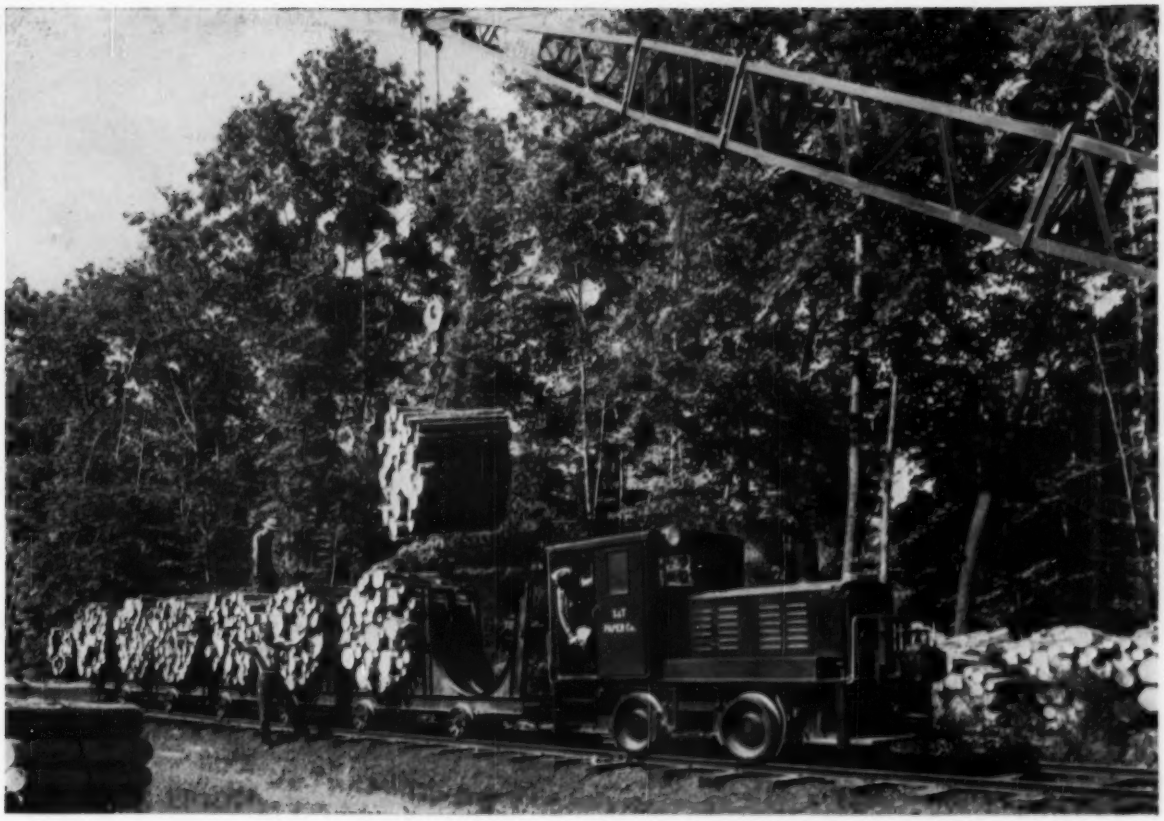
The pile driven was 132 ft long and made of 105 pcf concrete. At grade elevation, the pile was being driven by 35 blows per foot of the 32,500-ft lb hammer. And 2 ft below grade it took 131 blows per foot to drive the pile. This would amount to a 162-ton bearing capacity as computed by the Engineering News formula. Some minor spalling occurred at the head of the lightweight pile. But, in view of the excessively hard driving, this was not considered serious. Heads of the regular prestressed concrete piles were in excellent condition after driving.

In addition to filling in the area between the two piers, the construction program calls for expanding the shedded area on the piers. Each of the existing piers is covered by a transit shed, one with a steel frame and the other with a wood frame. One wall of each of these sheds was knocked out and the covered area extended 43 ft. Result is a total pier area of 398,000 sq ft of which 258,000 sq ft is shedded. And the pier has a 800-ft berthing length on each side with a 486-ft berthing length at the end. Modification of the sheds is being carried out under a separate contract.

The design and construction supervision of the work is handled by the engineering department of the California State Harbor Commission under the direction of S. S. Gorman, chief engineer. Superintending the pile driving and deck construction work for Ben C. Gerwick, Inc. is John Ford, with Jack Weiss in charge of the casting yard work. The Gerwick contract is for $1.4 million. Total cost of modernization program is $2 million.



PILES WERE DRIVEN to predetermined elevations. Excellent records of earlier work, together with some test piles, permitted accurate determination of lengths.



Plymouth's Greater Traction

MAKES THE GRADE!

"Smoother starting and superior traction" are the features of their 8-ton Model DLHT Plymouth Locomotive most welcomed by Stevens & Thompson Paper Co., Greenwich, N. Y.

Hauling heavy carloads of cordwood close to half-a-mile for processing is a 48-hour-per-week operation for the Plymouth owned by this well-known paper mill. Stevens & Thompson operators say their 8-ton Diesel Locomotive takes the grades to storage pile with effortless power. "They've commented especially on smooth starting, too," said Lewis Boex, purchasing agent for the mill.

Plymouth's reliable efficiency and economical operation are making continuous hauling jobs more profitable for large and small companies throughout industry. Steady power—with substantial fuel savings per ton of materials hauled—is a universal benefit in models from 3 to 70 tons. Plymouth Locomotives, Gasoline or Diesel powered, are available with mechanical or Torqomotive Drive*.

For an engineering analysis showing how Plymouths can best fill your hauling needs, send a brief outline to Plymouth Locomotive Works, Division of The Fate-Root-Heath Company, Dept. A-4, Plymouth, Ohio.

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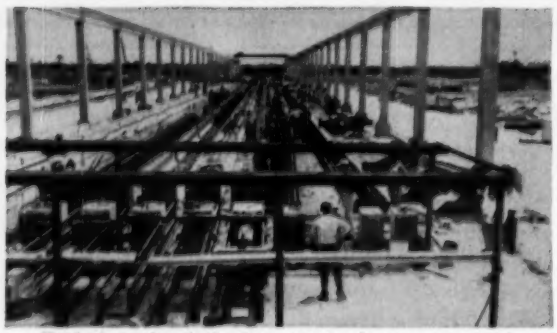

Typical casting bed where structurals are prestressed and cast. The operation is continuous and turns out prefabricated structural members in hours instead of weeks.

"Big" takes on a new dimension when applied to the National Highway Program. 40,000 miles of roads. 500,000 jobs. 32½ billion dollars. And about 300,000 new bridges, most of which can be built much faster and more economically with prestressed concrete than with any competitive building material.

It's history's biggest order for bridges. A giant demand for present makers of prestressed concrete. And a tremendous opportunity for those who decide to go into the business now.

For prestressed concrete construction answers this bridge need as nothing else can. In high degree of strength and permanence. Speed of construction. Savings in time and money. More profit for suppliers and constructors—greater value for taxpayers.

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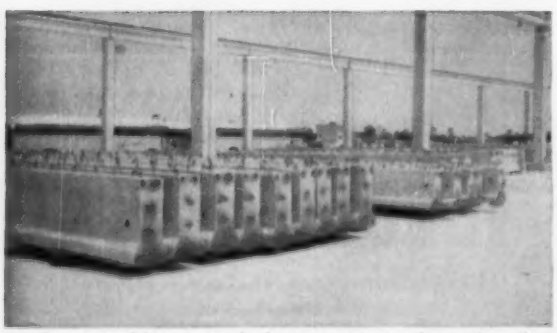

Prestressed beams ready for transportation by truck, rail or barge. The size of prestressed concrete members which can be cast in permanent site beds is limited only by transportation facilities and regulations. In on-site operations, prestressed girder spans up to 312 feet have been cast.

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dollar highway program
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strand and wire is proving its structural and economic advantages. Others range from fence posts to complete buildings and warehouses. Almost anything that concrete will do—it will do better when prestressed with Union Tufwire.

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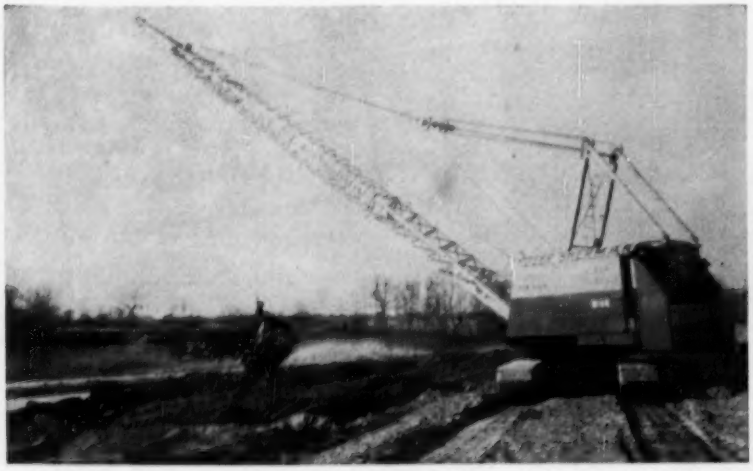


Muck material is scooped out on right-of-way at Indian River Swamp; dragline rig with 110-ft boom stands on newly placed fill.

Borrow is trucked in by new 27-cu-yd (heaped) off-highway haulers transporting

Low-Level Connecticut Pike: Lots of Mucking and Borrow

One of the biggest highway programs in the nation is being pushed by one of the smallest states—Connecticut.

Almost $203 million has been committed, of $430 million it will take to complete the 129-mi Connecticut turnpike (Greenwich-Killingly Expressway) some time next year.

In addition, an $80-million, two-year program of regular state highway construction and maintenance, and more than $18 million for repair of road and bridge damage left by two disastrous floods last year, have boosted highway projects on the books to more than $500 million.

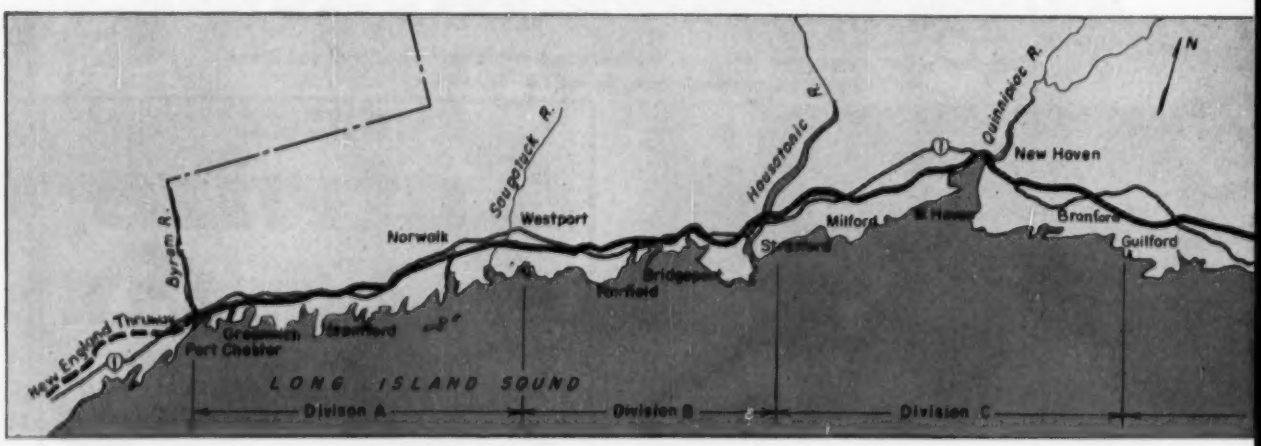
The little state, with an admirable record of self-sufficiency since its inception, is continuing its Yankee "go-it-alone" policy despite the size of the program. Unlike many other states, it has insisted on maintaining control of the new tollroad within the highway department rather than create an authority or other agency.

Thus, all planning, design, construction and inspection is carried on under Newman E. Argraves, state highway commissioner, and his staff of state highway engineers.

• **Technical manpower problem**—When the expressway program got started five years ago, highway department engineering manpower was too limited to cope with the entire job, so contracting engineers were engaged to design highways and bridges in segments under state supervision.

(The practice of retaining engineering firms has worked so successfully that when floods struck, one consulting firm was engaged to assist the state in overall operation of municipal road and bridge recovery, and eight others, each to a group of towns, for the detailed work of restoration.)

A total of 34 firms of engineers and consultants in specialized fields has been at work on the turnpike and its structures since early stages of planning. There are 41 contracts under construction, all in the western por-



Shoreline route, leapfrogging the main truck artery (U. S. 1) and the NYNH&H Railroad mainline, called for more than 200 bridges and grade separations in the

replacement fill from rock cut one mile from fill site.

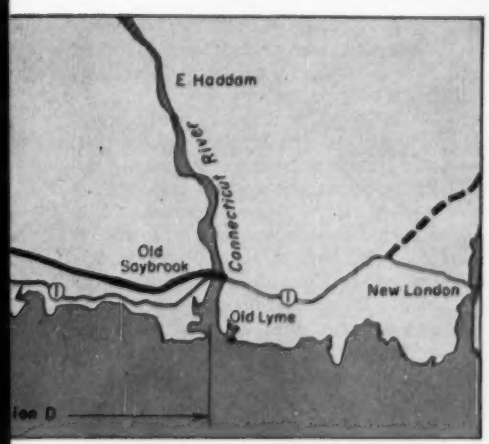
Balanced cutting and filling operation—one of the few such occurrences along right-of-way—is provided by a 70-ft-deep rock cut near Branford.

tion of the turnpike route, which lies between the New York State boundary and the Connecticut River at Old Saybrook, about two-thirds of the total distance. As of July 6th, about $19-million worth of construction contracts had been awarded on the northeastern leg of the turnpike.

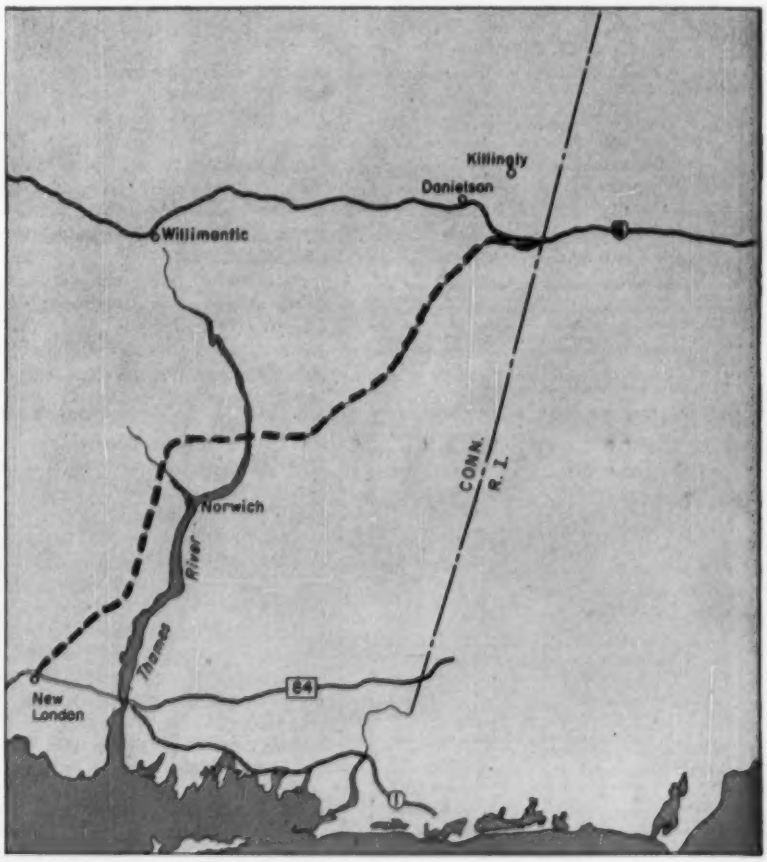
The route now under construction is broken down into four divisions, under supervision of state division engineers. Each division comprises contract sections, with state liaison engineers working with consulting firms. These men are in daily contact with their respective division heads, project engineers of the consulting firms and representatives of all contractors in their sections. This administrative arrangement has been highly successful, allowing state control, yet not taking so many department men that regular programs would suffer.

• **Tidal tollroad**—Most significant factor in route location of the turnpike is that it is a tide-level highway through most of its length. Nowhere between the New York state line at the Byram River and a point a few miles west of New London on the Thames River does the right-of-way penetrate more than a few miles inland from Long Island Sound. From the New London area, however, it swings northeast to intercept the Rhode Island state line more than 30 miles inland.

The low-level route establishes the unusual character of operations. First, in every section there are extensive mucking operations, with 50,000- to



portion between the Byram River and New London area.



Turning inland, the route from the New London area (not yet under construction) swings toward the northeast and arterial connections with Massachusetts and Maine.

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. . . Conn. pike—equipment on parade

75,000-cu-yd removals of unsuitable material common, and volumes up to line, and another over U. S. Highway 1.

The railroad has warned that service is not to be interrupted for any reason for even the shortest period of time. Further, the railroad has refused permission to Terry engineers to raise steel beams from flatcars, snaking them between overhead power lines and finally swinging them into position over the tracks. All work on the crossing structure, then, must be done from up top.

The current plan is to cut current on one 22,000-v power line, cantilever all steel over the power line catenary, switch power back on in that one, and repeat the procedure from the other abutment.

After passing over the railroad catenary, the bridge proper will go underneath another series of high-voltage power lines that are slung across the harbor between two high towers. Fortunately, this operation will not involve dangerous proximity to either the towers or the powerlines, although care will be exercised at mid-span, where crane booms might prove a hazard.

• **Equipment parade**—The ninety-odd miles of turnpike now under construction have taken on the aspect of a road show. The variety of operations, from mucking to vertical sand drains and sand blanketing, and from rock cuts to out-sized borrow operations, has called out an unusual variety of equipment.

In mucking, alone, some contractors have settled for draglines; others, claiming that dragline operation stirs up the muck to make the job more difficult, have turned to clambucket rigs. Still others are removing material with hydraulic dredges. Replacement material is trucked to muck sites from rock cuts, borrow pits and shoreside stockpiles in a vast 150,000 cu yd encountered in some places.

Also, because of the low-level route, it has been impossible to balance cuts with fills, so these portions of the project have been largely a borrow operation, with occasional rock cuts furnishing some replacement material.

Largest borrow operation—the dredging of the Bridgeport Harbor—is 80% complete. A 27-in. hydraulic dredge has excavated more than 3,500,000 cu yd from the harbor bottom and stockpiled the material where it will be accessible to contractors as far as ten miles away. When completed, the harbor deepening will provide more than 4,500,000 cu yd of top quality base material.

U. S. Highway 1 and the main line of the New York, New Haven and Hartford Railroad also follow the shore route, and the turnpike plays leapfrog with both throughout the portions now under construction. More than 200 bridge structures are now under contract and there are 74 more yet to come.

• **Difficult bridge**—Eight of the structures are high-level bridges over navigable rivers, and the biggest bridge is a $12.1-million, 2,679-ft (abutment to abutment) structure over Bridgeport Harbor.

One of the trickiest structures on the turnpike, from a contractor's viewpoint, the Bridgeport Harbor Bridge will have a channel span of 150 ft, pier to pier, with 65-ft-3-in. clear height above mean high water. A. S. Wikstrom, Inc., Skaneateles, N. Y., was awarded the substructure contract in February, 1956, and is now getting started with its share of the project.

The superstructure contractor, Terry Contracting Co., of New York City, is planning its steel erection schedule with some degree of concern. On the western approach—also a Terry contract—there is a crossing of the New Haven main variety of hauling equipment.

For example, at Indian River Swamp, a dragline rig with a 110-ft boom is removing muck, and new rear-dump, rubber-mounted haulers are carrying fill material in 27-cu-yd (heaped) payloads per trip. These haulers, according to operators and project engineers, were timed in competition with three-axle trucks, and it was found that four minutes per 2-mi round trip were saved by using the big rear-dumpers.

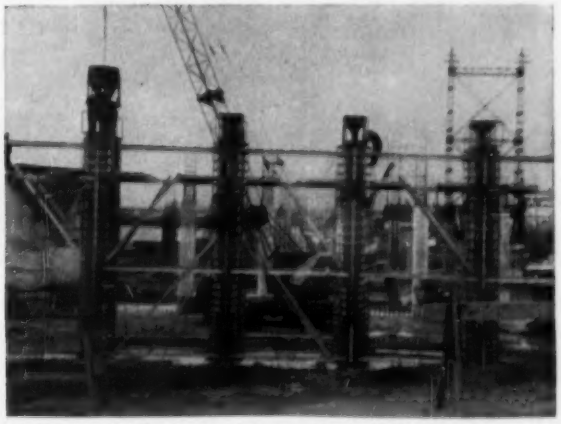
Less than a half-mile away is a rock cut with track-mounted drill rigs supplied by shiny new compressors and showroom-clean, two-axle off-highway haulers served by an equally sparkling 4½-cu-yd dipper shovel.

Construction activities range from clearing and grubbing in an area east of Milford to paving operations near Saybrook, at the eastern end of the portion now under contract. New England-bound tourists will get a closehand look at many phases of the project this summer, because batch plants, equipment maintenance shops, and in many cases, construction operations, are within easy sight of the heavily traveled U. S. 1.

• **Sand drains unsuitable**—In one section of Division D, near Saybrook, vertical sand drains and sand blanket—six ft thick in three lifts—were pro-

LAKE will all but disappear, after mucking and filling operations, in exclusive Greenwich where right-of-way parallels routs of New York, New Haven and Hartford Railroad mainline.

FURTHEST ALONG of the crossings over navigable streams is the structure across the Norwalk River.



APPROACH PIERS for the Housatonic Bridge are poured in steel strap-fastened forms for quicker fabrication and stripping.

posed, with 38,000 lin ft of sand wells on a 10-ft grid. But it was found by Roland Brown, state division engineer, that the mucky subsoil would not sustain the load.

The bad section was finally mucked out to a depth, in some places, of 40 ft, with 145,000 cu yd of unsuitable material removed. The muck was replaced by 163,000 cu yd of borrow, mostly gravel. In addition to the sand drains and sand blanket material, the operation saved installation of more than 4,600 ft of perforated drainage pipe originally slated for the job.

Altogether, more than 1,000,000 cu yd of borrow have gone into Division D alone. But one contractor may make a profit out of a borrow pit. One of the earlier contracts awarded, a 5-mi section that involves seven bridges, grading, drainage and paving, went under construction in January, 1955.

The contractor, L. G. DeFelice & Son, Inc., of North Haven, Conn., located and purchased a farm less than 300 yd off the right-of-way, with natural gravel on the premises. It is said that after the pit pays out, or when the volume of bank run is no longer needed. DeFelice may convert the pit into a recreational park with swimming pool, almost within sight of the Saybrook interchange. The operation, according to engineers in the section, would entail a simple diver-

THE HEART OF TWO CITIES lie in the path of the turnpike. This scene in Bridgeport, and others like it in New Haven, are extensive wrecking jobs.

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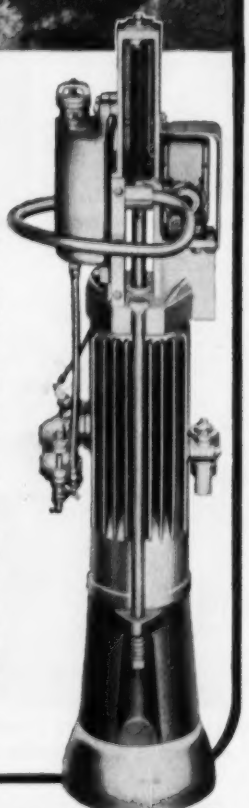

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sion of a stream that runs halfway around the pit.

• **Nonstop to New York City**—Meeting the Connecticut turnpike at the Byram River, is the New England Thruway, $50 million worth of connecting expressway that will terminate in the northern section of New York City. The 14-mi link, which is scheduled for completion during 1958, is being constructed by the New York State Thruway Authority in order to relieve—and allow reconstruction of the already congested Hutchison River Parkway, which parallels the route.

Acquisition of land over the connector has been expensive, penetrating the heart of New Rochelle, N. Y., and passing through some of the choicest residential properties in eastern United States. Cost of the 3-mi New Rochelle section alone is estimated at $22 million, which includes replacement of the city's New Haven mainline station at the expense of the authority, construction of an elevated 1,250-ft viaduct over the southern portion of the city and demolition of many of its centrally located buildings.

Two other mainline stations are slated for replacement, also. They are located at Larchmont and Rye, in New York.

The link ultimately will feed traffic to and from New England into New York City's growing urban network, with ready access to Long Island, eastern and western portions of the city and onto circumferential routes for through-traffic bound around New York's business areas.

Half of Burned Rubbish Goes Up in Air as Smog

Leslie Chambers, new research director of Los Angeles County Air Pollution Control District, reports that rubbish burning may be a more serious contributor to smog than was previously believed. Recent research, he stated, indicates that approximately half of all material placed in single chamber incinerators goes into the atmosphere as air pollutant—approximately 75% as carbon monoxide, 23% in the form of various organic compounds, and the remaining 2% as solid particles.

On the basis of these studies, Chambers estimates that pollution in Los Angeles County from all types of single chamber incinerators (industrial, commercial, and backyard) probably totals more than 5,000 tons a day, plus another 1,000 tons from open burning—"closely rivaling or exceeding air contamination from motor vehicle exhausts."

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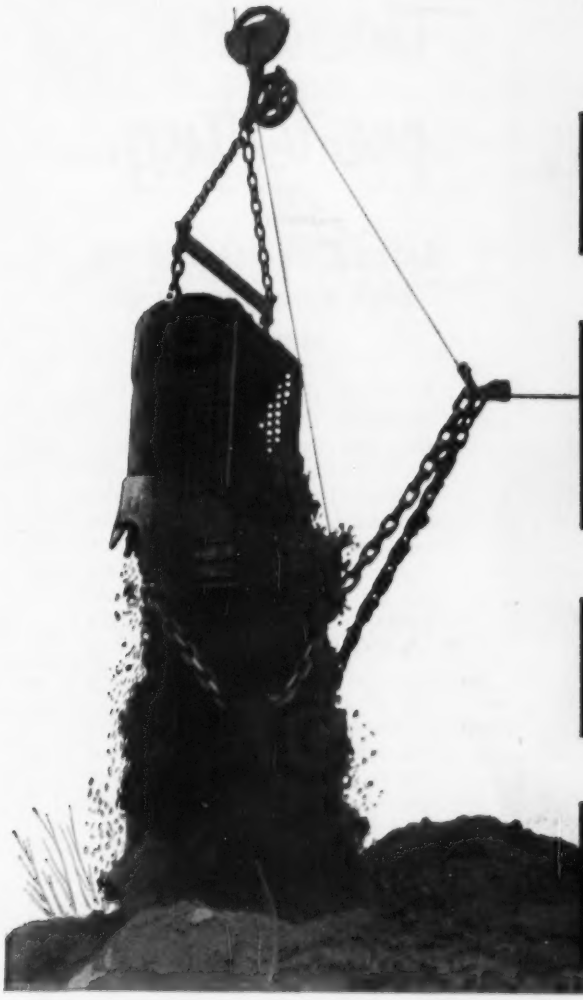

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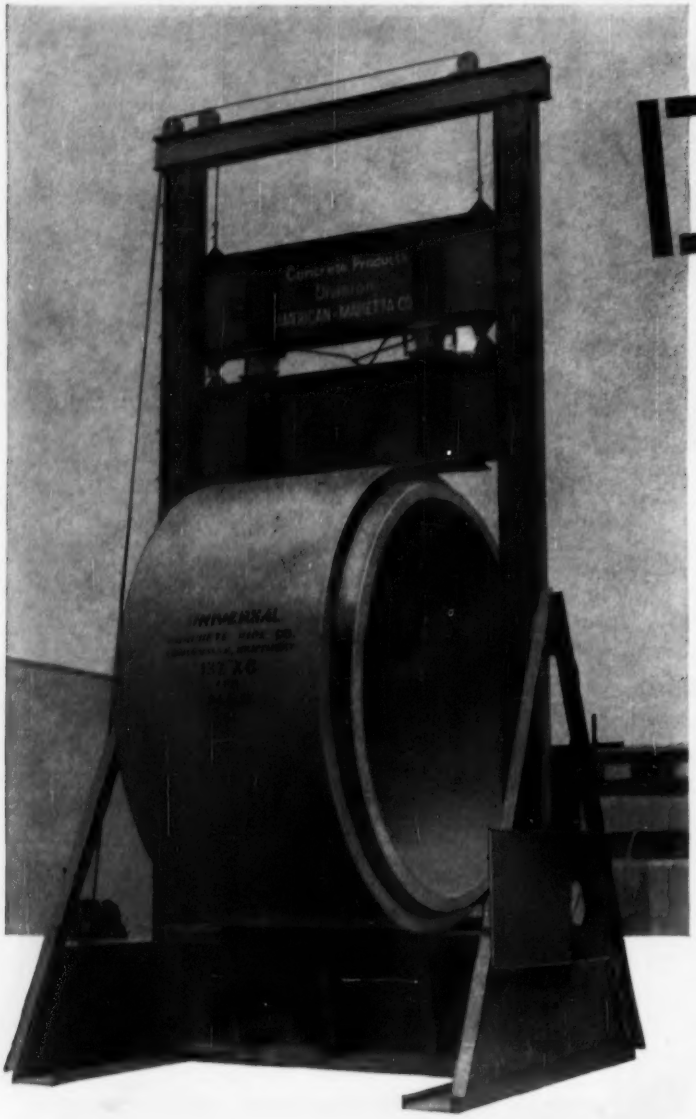

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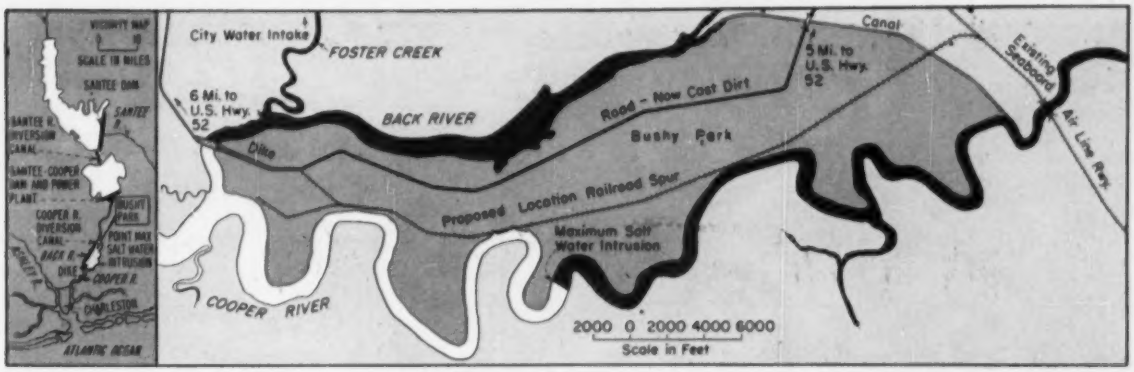


River diversion scheme to develop 10-bgd industrial water source near Charleston, S. C. hinged on . . .

Placing a Marl Dike in Tidewater

Clever "seat-of-the-pants" engineering has enabled early completion of the ingenious Cooper River diversion scheme near Charleston, S. C., making available on exceptionally large —and cheap—industrial fresh water supply.

Bushy Park, a virgin 4,000-acre strip of greenery bounded by the fresh-water reservoir and the Cooper River just 3,000 ft away, now is expected to become a beehive of industrial activity. For in addition to limitless soft fresh water, Bushy Park offers the Cooper River for waste disposal and an eventual tidewater port, service by a main-line railroad, convenient access to main highways and readily available power.

The basic scheme was presented in ENR Mar. 22, p. 33. Simply, the Cooper River has plenty of fresh water, released by a power dam 40 mi upstream, but salt-water intrusion halfway up the Bushy Park strip voided its use. Now, a canal diverting upstream Cooper water into the Back River and a dike downstream across the Back River to prevent salt-water instrusion has turned the Back River into a sizable reservoir fed by as much as 10 bgd released at maximum power generation—and for a total construction cost of about $3 million.

The dike—called that rather than a dam since it is subjected to very small heads due to tidal variation—is 5,830 ft long and 80 ft wide along the crest to accommodate a highway and a railroad spur. Actual width of the Back River at the centerline is 650 ft, but the adjacent banks are marshland. Height from river bed's low point to crown of road is 50 ft.

• **Marl makes the dike**—A landfill dike having 4:1 slopes was first considered but rejected because satisfactory landfill in the amount required would have meant hauls of up to 10 miles. Two local consultants, John McCrady and J. H. Moore, decided that a hydraulic-fill dike was feasible and could be constructed faster and cheaper. It was felt that neither of the possible fills, sand-silt and the area's famous "Cooper marl," would slough off and be carried downstream into the Cooper in amounts that would be objected to by the Corps of Engeneers. The fill was to be uncompacted, taking its natural slope.

Protection of the fresh-water reservoir from contamination by salt water overflowing from the Cooper during hurricanes was a prime consideration. Originally, a levee along the Cooper

CHUNKS OF MARL up to 12 in. formed in pipeline of rotary cutter dredge.

12:1 SIDE SLOPES resulted from unconfined marl placement. Almost all settlement took place in first 24 hours. Sand-clay landfill is subbase for highway, railroad.

. . . Brute force method used to place marl

BUSHY PARK PRINCIPALS: Authority's consultant, Joseph H. Moore shows Chairman William McG. Morrison, Mayor of Charleston, size of marl chunks composing dike.

River side of Bushy Park was planned, which would also protect the industrial area itself from flooding. But a cheaper and eventually as satisfactory a scheme was finally evolved. A cast dirt road built up the middle of Bushy Park now serves as the levee, supplemented by an embankment raised north of the bridge across the new canal. When a railroad is built, it will be located about where the original levee was planned, thus affording complete protection to the industrial area.

Construction at Bushy Park began late in October, 1955, and was substantially complete in early April, several months ahead of schedule, under a $2,550,000 contract between Robert Lee, Inc. of Manning, S. C., and the Bushy Park Authority, a state-authorized agency charged with administering the project. A landfill dike would have taken about a year longer.

• **Canal design modified**—The canal was worked first, with the idea of opening it early enough to aid in the placement of fill on the dike. It was hoped that the canal would act as a relief valve during tidal action in the Back River (high tide occurs about 1¼ hours after the same point is reached in the Cooper River), thereby reducing current velocities and resultant sloughing of hydraulic fill during closure.

The diversion channel is 3.3 mi long and was originally figured as a trapezoidal section, 55 ft wide at the bottom with 3:1 side slopes. To facilitate excavation by a cutter dredge, channel shape was changed to a box section, 98 ft wide. Minimum depth is 9 ft below mean sea level.

Working in sand, heavy clays and some marl and lime rock, a 16-in. cutter dredge opened the diversion channel late in January. Consultant Moore, retained as project engineer by the authority, figured that the sheer canal sides would slough off to about a 2:1 slope, thereby attaining a section approximating the original design but having 40% more area. Field observations that were made in May tended to confirm this assumption as sloughing off was proceeding rapidly.

The dike was begun in November, 1955, upon the arrival of the "Admiral," a 2,000-hp dredge equipped with rotary cutter and 27-in. line that was rented on a time basis from Arundel Corp. of Baltimore. In about 2½ weeks, 600,000 cu yd of marsh mud were pumped out, exposing dike foundations varying from sand to clay to marl.

Use of marl as the fill, rather than sand-silt, was a field decision made by Moore and the contractor. The local marl has the fortunate characteristic of retaining a consistency akin to cold cream cheese when wet, but upon exposure to air forms a hard crust that does not flake or chip easily. It contains about 95% calcium in various forms, mainly oxide, plus magnesium and silica. The marl embankments on the Back River contain about 10% of sand and clay.

The big questions were how would the marl act when cut and pumped as a slurry to the dike, what slopes would it settle on, and would an uncompacted fill not settle excessively?

Early operation proved the choice of marl. It formed balls up to 12 in. in diameter when pumped in a 10% solids mixture. There were also sufficient fines of marl and sand to fill the voids between larger chunks when placed as fill. And whereas it was estimated that a sand-silt fill would form 20:1 slopes, the marl held on 12:1 slopes.

But the most pleasant discovery was that practically all settlement took place in the first 24 hours after placement. Checks have shown inconsequential settlement thereafter, even with heavy dozers and pans placing a sand-clay road subbase over the marl.

With the big dredge taking a 5-ft cut on a 200-ft swing, 20,000 cu yd of marl fill per day were placed over a three-month period. A total of 1,800,000 cu yd was delivered, about 1,200,000 cu yd remaining incorporated in the dike. A 10% solids mixture was pumped.

• **Closure without cofferdam**—So well did marl placement go that the contractor abandoned any thought of making closure with landfill and rocks, with or without the aid of cofferdams. He adopted a brute force method—maximum pumping of marl at the right time.

An island of fill was placed in the middle of the riverbed and enlarged in both directions until two wide V-shaped openings remained, one 40 ft deep, the other 15 ft deep. The deeper opening was filled to above high-water level with little trouble. Fill placement in the shallower opening proceeded routinely until an opening about 40 ft at the top and 6 or 7 ft below high-water level remained. Then the tidal currents began to take a heavier than normal toll.

Surprisingly, most of the washing away of fill took place during low tide when flow became powerful. Difference between high and low tides was 6 and 7 ft during late February when closure was being attempted. Opening of the dredged canal appeared to have little effect on tidal currents at the dike.

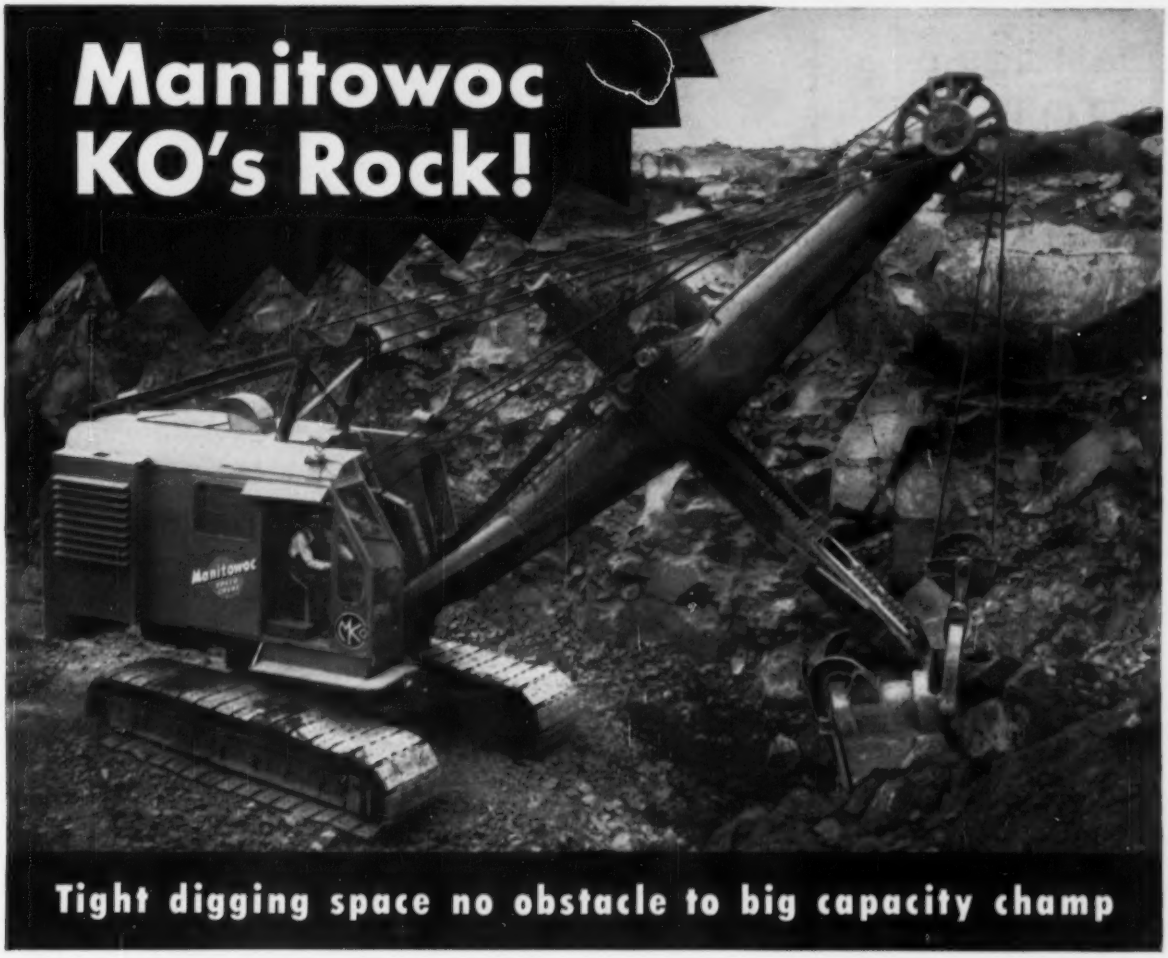
Eleven times the contractor waited for high tide, pumped fill at 1,000 cu yd per hr and saw it wash away as the current became stronger. But on the twelfth try, enough fill was placed to make effective closure.

The dike crest is at El 13.7 while specifications called for marl at least up to El 4.0 (MHL is at El 3.5). However, with hydraulic fill costing an estimated 50 cents per cu yd in place (versus more than $2.00 for landfill), contractor topped marl out at elevations between 9 and 11.5.

Big D-9s and 25-yd scrapers quickly finished out a sand-clay subbase which was dressed to 4:1 slopes. The subbase received no compaction other than what was obtained from the big hauling equipment. This roadway was continued up through the Bushy Park site to the bridge.

The Bushy Park Authority has

Manitowoc KO's Rock!



Tight digging space no obstacle to big capacity champ

Tough volcanic rock has met its master in the rugged 2½-yd. Manitowoc shovel used by Morrison-Knudsen, Inc. during one construction stage of Dalles Dam. The job involves relocating 14 miles of road bed for the Seattle-Portland-Spokane Railroad. Well over a million yards of volcanic rock have to be excavated before the project is finished, and this unit will be on the job till the end. Working in extremely narrow quarters, the Manitowoc 3500 is moving over 2,000 yards daily of the unusually hard-to-handle heavy rock. Torque converter power assures smooth, steady digging; positive steering is a must in the tight working space; an all-cast, manganese Esco dipper (optional) is specially rugged for tough rock work. Here's a rough job calling for a machine having the guts and power of a real rock shovel, with the mobility of a small excavator.

Extremely clean, simple design of the Manitowoc shovel produces more bite at the dipper because no power is wasted. Only 17 gears and pinions are in the entire machine, with only working gears turning to get full capacity from every unit of horsepower. Exclusive sliding pinion arrangement uses one set of clutches to drive travel, swing and boom hoist.

Shovel boom is high-strength alloy steel . . . built to take severe twisting and bending under tough digging conditions. Twin dipper sticks are of reinforced box section design . . . roll through saddle blocks on four adjustable rollers, achieving full utilization of power.

Simple, fool-proof air controls help eliminate operator fatigue. Smooth torque converter power makes for a more efficient operating cycle. There's no stalling of the motor, no over-loading . . . power is perfectly balanced to the load. You get the most efficient use of your machine with torque converter power . . . pioneered by Manitowoc in excavators.

Take advantage of Manitowoc's superior features. Your helpful Manitowoc distributor can fill you in on the complete story. Call or write him today for literature and specifications!

Manitowoc Engineering Corp., Manitowoc, Wis.

MANITOWOC

SHOVELS 1-5½ YD. Speed Crane CRANES 20-100 TON

Details on a
BETTER
PENCIL
(MARS TECHNICO with
Mars Lumograph lead)

Mars Technico clutch mechanism, made of brass for longer life. Noiseless, smooth working, almost frictionless. Serrated to lock lead in place. Grips 0.3" of lead.

Brass tip; 6 bands of serrations prevent slipping.

Mars-Lumograph lead; ribbed to hold securely. Does not flake or smudge; so opaque, inking-in is unnecessary.

Balance point; located 2.7" from tip for perfect pencil balance.

Mars Technico tubular brass insert; houses the lead. Threaded at base for positive locking of clutch mechanism in place.

Housing; kiln-dried cedar for light-but-sturdy construction.

Total weight only .47 oz.

Spring; 2" long, made of fine steel for proper tension control of clutch mechanism.

Mars Technico push button; for instantaneous release or adjustment of lead; with brass lead-sharpener, recessed in push button, easily removable. Keeps lead sharpened without spreading graphite dust in work area.

Mars-Lumograph lead, finest graphite meticulously graded from 6XB to 9H (18 degrees) for better reproduction

Unique brass cap at top, prevents lead from falling out when clutch mechanism is released.

J.S. STAEDTLER, INC.
HACKENSACK, NEW JERSEY
at all good engineering and drawing material suppliers.

hopes that the state highway department will pave the road into the area, but according to C. R. McMillan, chief highway commissioner, the department "does not have any plans at this time."

Now Bushy Park awaits its first industrial inhabitant. He will be enticed there by many lures. The fresh-water reservoir is fed by as much as 16,000 cfs, or 10 bgd, from the Santee-Cooper Power Authority dam 40 mi upstream. At present, thermal plants carry base load with water power supplying the peaks, so "safe yield" at Bushy Park is guessed at 2.0 bgd (accurate calculations are in progress). This is still a lot more water than can be used in 4,000-acre Bushy Park. Consequently, huge growth in the surrounding area is possible.

• **No sewage treatment yet**—Necessity of treating industrial wastes is not clear-cut at this time. The South Carolina Water Pollution Control Authority has recently completed a comprehensive study of the Cooper River over a 26-mi stretch including Bushy Park. While results indicate that the total absorptive capacity of the Cooper River has not been reached, need for providing treatment for additional discharges is foreseen within the future—possibly only two or three years distant.

One of the brightest features is port development. Recently, the Corps of Engineers included the Bushy Park portion of the Cooper River within the limits of Charleston harbor, and is studying the feasibility of deepening the channel to 35 ft. The South Carolina Port Authority has been authorized to sell $10 million worth of bonds for improvements at Charleston harbor. None of the money is for Bushy Park but its influence will spread to that site.

Electric power in considerable quantity will have to be obtained from new facilities. Two organizations, the public Santee-Cooper Power Authority and the private South Carolina & Gas Co., are very much interested in building a plant in Bushy Park. The Seaboard Air Line Railway is also reported ready to build a spur into Bushy Park.

It is apparent then that Bushy Park can have tremendous effect on the Charleston region. If this potential is not realized, it won't be for lack of boldness, enthusiasm, faith and ingenuity of its backers. Many who know the story shake their heads, while defenders point out that pioneering often requires unusual means.

The river diversion scheme was recognized many years ago by J. E. Gibson and Francis B. McDowell, deceased and recently retired chief engineers of the Charleston water department respectively, who saw it as a means of preserving a portable water supply for the area. In the late 1940's, Arthur M. Field, engineer-director of the Charleston Development Board, which is a privately supported organization established to attract new industry, spelled out the industrial growth aspects in detail.

Armed with this conception, officials and citizens of Charleston and adjacent Berkeley Counties attempted to sell some large industrial organization on the benefits of Bushy Park through the early 1950's—the incoming industry to accomplish actual development. Failing this, in 1953 they asked the state legislature to create an eight-man public authority to construct the water reservoir and derive its income from the sale of water.

• **Bizarre financing**—The infant Bushy Park Authority had tremendous potential but that alone wasn't sufficient to convince hardheaded bankers. A rather bizarre financing scheme was concocted. Some $175,000 was obtained from the federal government for initial planning and engineering—performed by Ford, Bacon & Davis of New York. The Commissioners of Public Works, an autonomous public body responsible for Charleston's waterworks construction and operation but with close ties to the city administration, was persuaded to purchase $1,050,000 worth of bonds which were guaranteed by the Charleston City Council. Some direct benefit is received by this water agency, since it recently completed a 50-mgd intake on Foster Creek, which reservoir is now protected against salt-water intrusion. Without the dike, pumping might have to be discontinued for short periods of intrusion.

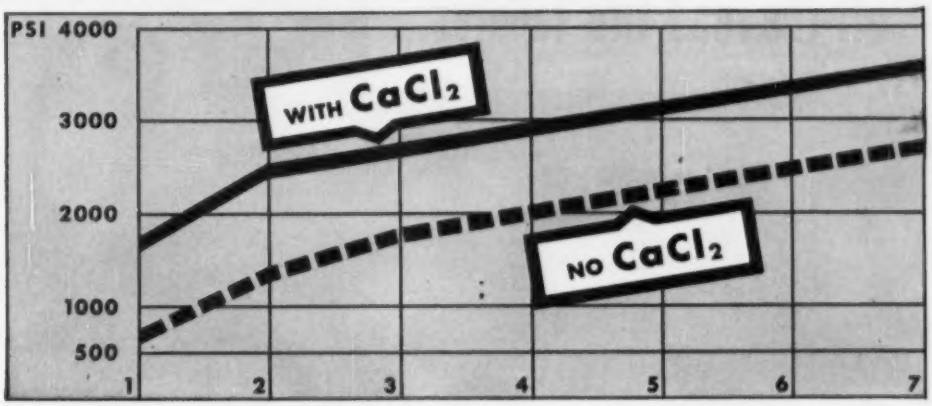
After lengthy negotiation, the contractor, Robert Lee, Inc., agreed to construct the dike and diversion canal for $650,000 in cash and $1,900,000 in bonds. Most of the authority's funds have been used for the cash payments to the contractor and a down payment on the land in Bushy Park. Recently, succeeded in borrowing another $850,000 from the State of South Carolina to pay for the land.

Policy of the authority is to sell the land to industrial users roughly at cost, using revenues from the sale of water to amortize the outstanding bonds. However, there is still some question on the legal aspects of the authority's right to buy and sell land.

Prime mover of the development plan and chairman of the Bushy Park Authority is William McG. Morrison, Mayor of Charleston.

SPEED PRODUCTION SCHEDULES

with COLUMBIA CALCIUM CHLORIDE!



increases strength of concrete 50% in 3 days!

HIGH EARLY STRENGTH

Columbia Calcium Chloride develops high early strength in concrete, summer and winter. The chart shows how the addition of Columbia Calcium Chloride to the mix increases 3-day compressive strength from 1800 pounds per square inch to 2700 pounds per square inch . . . an increase of 50%.

This high early strength is beneficial for a number of reasons. It permits removal of forms in one-half the normal time, thereby reducing the total number of forms required for construction. Early removal of forms permits quicker pouring of additional lifts and earlier use of the structure by other trades.

ULTIMATE STRENGTH

Not only does Columbia Calcium Chloride increase early strength, but ultimate strength as well. One to three-year tests of calcium chloride integrally cured concrete show increases of 9% to 12% over plain concrete. Thus, lasting strength benefits are obtained.

CURING

Columbia Calcium Chloride in the mix provides thorough curing. By all measures of the results of curing such as compressive strength, flexural strength, hardness, durability, and resistance to wear, concrete cured with Columbia Calcium Chloride compares favorably with any other known method of curing, including three day wet burlap.

In structural concrete, it is often difficult to get proper curing without resorting to time-consuming and costly methods such as continuous wetting. By the use of Columbia Calcium Chloride, proper curing is "built-in" the concrete structure.

These are the advantages you get by using Columbia Calcium Chloride in your mix:

- Quicker set
- Higher early strength
- Better curing
- Faster form removal
- Greater ultimate strength
- Increased wear resistance
- Increased workability

For further information, write today to Calcium Chloride Department at the Pittsburgh address.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

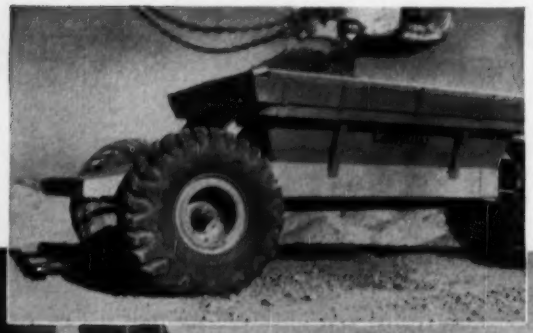
ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

DISTRICT OFFICES: Cincinnati • Charlotte • Chicago • Cleveland • Boston • Dallas New York • St. Louis • Minneapolis • New Orleans • Houston • Pittsburgh Philadelphia • San Francisco

IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

On your next project, for better, faster, stronger concrete use the proved, time-tested way—use Columbia Calcium Chloride!

Nylon cord tires reduced off-the-road tire failures...



NOW NYLON CUTS TRUCK TIRE COSTS, TOO

M. C. TRENT,
Vice Pres., F. M. Reeves & Son, Inc.
Roswell, N. M., reports:

"When we found how well nylon cord tires stood up on off-the-road units, we started using them on our trucks, too. That was two years ago. Since using nothing but nylon cord tires, we haven't had a single tire failure!

Nothing but Nylon

"We haul concrete, sand and gravel, so our equipment gets a beating both on and off the road. We're so pleased with the way nylon cord tires have worked out that we use nothing else—on old or new equipment."

PROVE TO YOURSELF that nylon cord truck tires give more mileage, more retreads—lowest cost per mile. Ask your dealer about nylon cord truck tires today. (Du Pont makes the tough nylon yarns, does not produce tires.)

DU PONT NYLON for TIRE CORD

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

NOW . . . IN PASSENGER-CAR TIRES, TOO . . . THE STRENGTH OF NYLON . . .
FOR UTMOST SAFETY . . . SUREST PROTECTION AGAINST TIRE TROUBLE

Materials Crusher Swings 22 Hammers

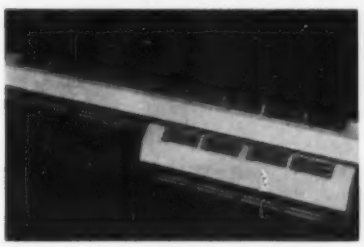
A new piece of roadbuilding equipment called the Bros Preparator, has been developed for use on many types of materials.

The machine is a tow-type impact crusher incorporating in its design 22 free-swinging hammers to pulverize materials over which the machine passes. The hammers swing from a common shaft driven at 1,000 rpm by a V-belt direct drive.

The hammers are a special alloy steel of long wear quality and are mounted on the shaft so that they can be easily replaced, although the manufacturer says that initial models have shown no appreciable wear under exhaustive use.

Production of up to 400 cu yd per hr have been experienced with types of limestone gravel. River boulders with an abrasive index of only 4 points less than diamonds have been reduced to a —2 in. aggregate. In this latter case, the manufacturer says, the material required two passes to make a total production rate of 50 cu yd per hr.

The machine may also be used to pulverize scarified blacktop pavement which can then be re-used. The Preparator operates at a 1½-mph speed and can be towed by any tractor of 30 hp or more. Boulders up to 30 in. in diameter have been reduced to specification sizes in one pass. Road Machinery Div., Wm. Bros Boiler & Mfg. Co., Minneapolis.



Baseboard Is Electric Heater

Conventional baseboards have an attractive and functional successor in Crystalvector, an electric baseboard heater designed for homes, offices, motels and other buildings where perimeter heating is suitable. Fin-tube 220/240v elements supply heat by both radiation and convection.

The heaters are made in two sizes—4-ft 1,000-w and 2-ft 550-w. Outlets for 115-v appliances—like lamps—are available as a built-in accessory. Crystalheat Co., 14761 Keswick St., Van Nuys, Calif.

Medium-Sized Motor Scraper Maintains High Yardage Ratio

With its new TS-260 motor scraper, Allis-Chalmers has introduced a new machine in the medium sized range.

The 200-hp unit, weighing about 39,600 lb, is powered by a 6-cylinder diesel engine. The machine has a 14-cu-yd heaped capacity.

Other design, engineering, construction and operating features add further to the performance and life of the machine. A hydraulic pump, gear driven from the rear of the engine crankshaft, provides positive drive and assures live power for steering and scraper operation. The curved bottom and three-piece cutting edge with offset center edge gives faster penetration and better loading, the manufacturer explains. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Heavy-Duty Combination Welder and Power Unit

A new gasoline-driven arc welder, with 6 kw or 12 kw ac auxiliary power has been announced by Hobart Bros. Co.

The manufacturer says that the welder is available in 300 and 400 amp sizes with a choice of 6 or 12 kw auxiliary power. Full capacity can be used to provide 110- or 220-v power service or the capacity can be divided between the two. Hobart Bros. Co., Hobart Sq., Troy, Ohio.

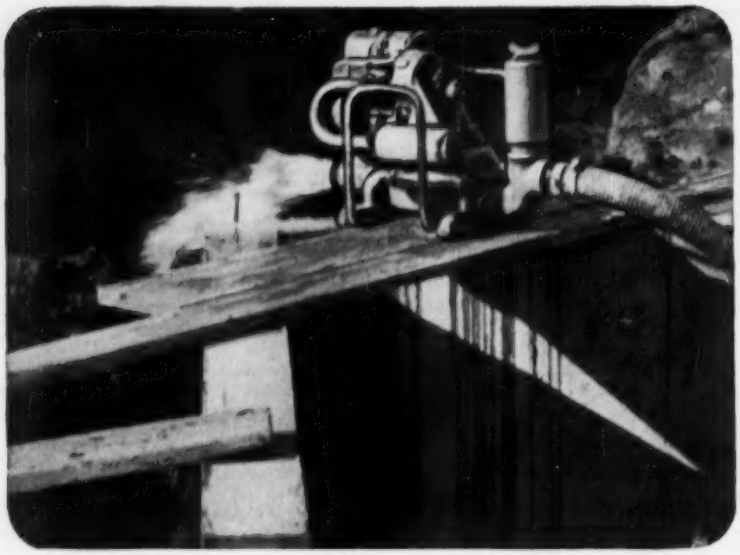
(*New Products continued on page 55*)

One-Man Vibrator

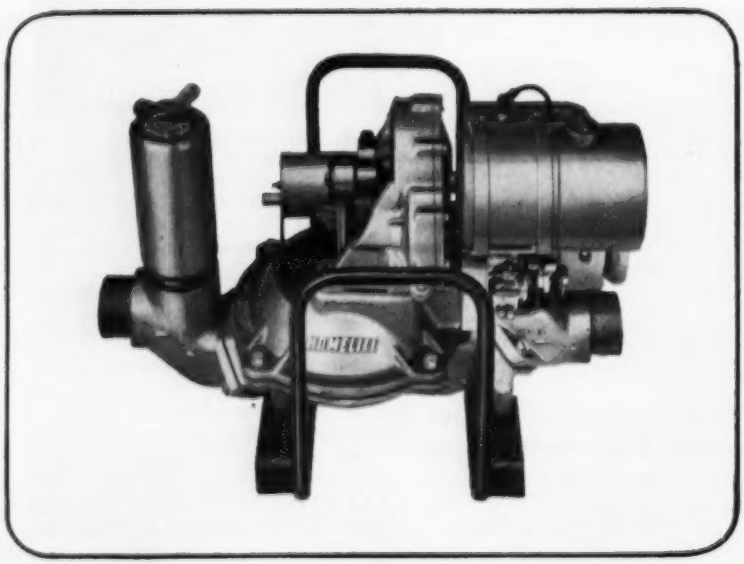
High work-time efficiency, greater use and flexibility and full portability are three operational features claimed for the new UniViber, a plug-in electric vibrator for use in concrete work.

The basic design of the machine includes a motor housed in the head, a flexible casing is used as a handle, and a switch located in the casing. The machine is small enough to be transported easily in the trunk of an automobile, and particularly designed for use in small concrete pours.

The machine is available in two models —Model 1M3R with a replaceable rubber tip, and Model 1M3, a housing with a steel nose. The head diameter is 3 in. Viber Co., 726 S. Flower St., Burbank, Calif.



It's here!
The new heavy-duty diaphragm pump that's light enough to carry



Here's the diaphragm pump that goes most easily to the job and does more when it gets there. Specifically designed for continuous, heavy-duty work, this Homelite pump will dewater an area at a 5000 g.p.h. clip, then keep right on going to handle seepage in the thickest mud, muck and sand. Yet, because it weighs only 120 pounds, it gets to the job fast . . . even over the roughest terrain.

The entire unit is built for long, trouble-free operation. Manual throttle control adjusts engine speed for full-capacity pumping or handling small seepage flow . . . gives greater fuel economy and prolongs engine life. Ball and roller bearings protect engine and pump from excessive wear. Totally enclosed reduction gears run in oil. Tough, oil-resistant diaphragm can be easily replaced in ten minutes right on the job.

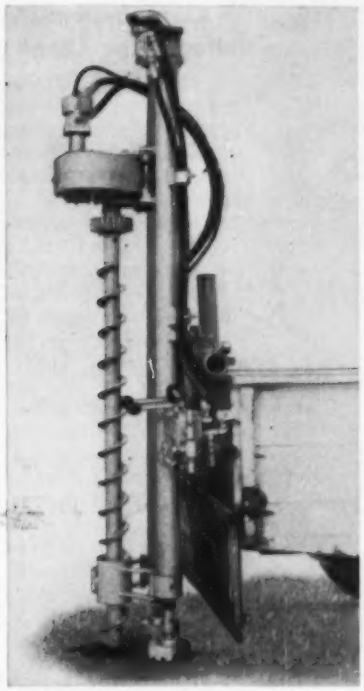
For more information or a demonstration on your job, write or call your nearest Homelite representative.

NEW HOMELITE
Carryable
DIAPHRAGM PUMP

Model 20DP3-1 has guaranteed total lift up to 28′ and total head up to 50′, including friction.

HOMELITE

A DIVISION OF TEXTRON, INCORPORATED
1107 RIVERDALE AVENUE
PORT CHESTER, NEW YORK



Truck-Mountable Drill Is General-Purpose Machine

A new general-purpose drill said to be mountable on a flatbed truck, crawler, farm tractor or other vehicle has been announced.

The drill can be used in any fore-and-aft or lateral direction at any angle from horizontal to vertical, the manufacturer claims. The machine is operated and controlled hydraulically, with power from a take-off on the carrier vehicle.

The unit handles augers from 3 to 12 in., and will drill 6-in. holes up to 60 ft in average shale. Maximum feed is 20 ft per min. Cardox Corp., 307 N. Michigan Ave., Chicago.

New Plastic Drainage Pipe Available in 30-Ft Lengths

Southwestern Plastic Pipe Co., has introduced a plastic drainage pipe, named Chem-Weld that is available in 2- through 6-in. diameters up to 30-ft lengths. The maker claims the pipe strong, durable, lightweight, unaffected by most acids and alkalies, and not subject to rust or electrolytic action. Root-proof watertight joints are said to result from a chemical cement that actually fuses two lengths of pipe.

The plastic pipe can be cut with an ordinary wood saw. Adapters are available to connect the plastic pipe to the spigot end of cast iron and clay pipe joints. No fittings are required to join the bell end of pipes of these materials to the plastic pipe. Southwestern Plastic Pipe Co., Mineral Wells, Texas.

New Motors Are Feature Of Masonry Saw Equipment

Full 2-hp continuous duty, fan-cooled, totally enclosed motors are a feature of all Clipper Super Model masonry saws.

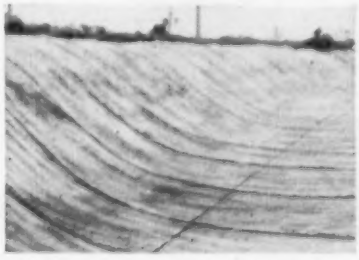
The motor is manufactured in accordance with new standards, the manufacturer announced and is especially designed for masonry cutting, lightweight for easy handling. To handle the extra power, the saws have heavy duty blade shafts and oversize bearings. Clipper Manufacturing Co., 2800 Warwick, Kansas City, Mo.

Asphalt Liners Installed Easily in Open Channels

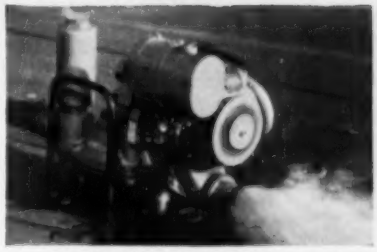
Speed and ease of installation are the significant features of "Hydromat" asphalt liners. Specifically developed to retard erosion and seepage in irrigation ditches, canals and reservoirs, the liner consists of an asphalt and fiber core sealed between layers of asphalt-saturated kraft, bonded to an independent weather coating. The liner is extremely flexible and will sustain soil movements without rupture.

Hydomat liners may be installed without the use of special tools or specially trained personnel. W. R. Meadows, Inc., 7 Kimball Street, Elgin, Ill.

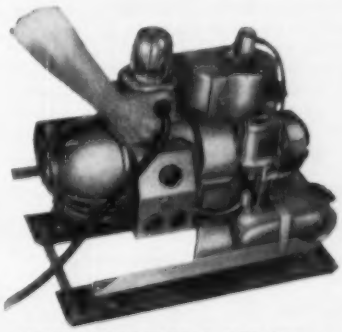
(*New Products continued on page 56*)



CHOOSE
from a full line of
HOMELITE
Carryable
Construction
Equipment



SELF-PRIMING CENTRIFUGAL AND DIAPHRAGM PUMPS
Sizes: 1½" to 3" — capacities to 15,000 g.p.h. for dewatering and water supply.



ELECTRIC GENERATOR SETS FOR TOOLS AND LIGHTS
Complete range of sizes and voltages up to 5,000 watts.

LIGHTWEIGHT POWERFUL ONE-MAN CHAIN SAWS
Complete line of saws with clearing and brushcutter attachments for every woodcutting job.

HOMELITE
A DIVISION OF TEXTRON, INCORPORATED
PORT CHESTER, N. Y.

There is No Worry about Failures or Maintenance Costs with TRU-LAY *PUSH*-PULL Remote Controls

• On Construction Equipment they are being adopted by an ever-increasing number of engineers because they are Rugged, Trouble-Free, Accurate and Adaptable to all sorts of mechanical situations.

Long Life is a matter of record. We have never heard of a TRU-LAY *Flexible* PUSH-PULL CONTROL wearing out in normal service. Failures, that sometimes harass users of more complex controls, are eliminated by the use of these simple, positive-action Push-Pulls.

Dependable Operation of these controls is a certainty, even under the most adverse conditions . . . HOT as jet engines (Note: TRU-LAY PUSH-PULLS are actually performing on hot jet applications) . . . COLD to 70° F. below zero . . SOAKIN' WET . . . ABRASIVE . . . or just plain TOUGH.

Freedom from Trouble is assured because of such features as . . . full protection of the inner, working member by the tough flexible conduit . . . lubrication of the working member *for life* during assembly . . . seals that keep moisture, dust and other foreign matter out of the unit . . . cold swaging of fittings that makes them integral parts of the control unit.

Accuracy is inherent in the basic design of TRU-LAY PUSH-PULLS. They are precision products, not gadgets.

Capacity ranges from light jobs up to jobs of 1,000 lbs. input. These Push-Pulls will handle jobs 150 feet or more from the control point.

Adaptability to all sorts of mechanical situations explains, in large measure, the use of TRU-LAY PUSH-PULLS on literally hundreds of different machines and equipment. The *flexibility* of these controls makes it possible to provide positive, remote-action whether anchorages are fixed or movable . . . it damps out noise and vibration . . . and reduces the number of working parts.

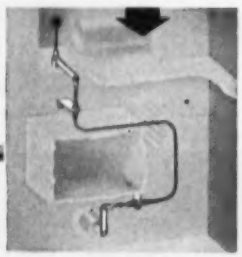
• • •

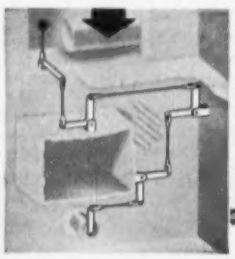
TRU-LAY PUSH-PULLS are "Solid as a rod but *Flexible* as a wire rope." This flexibility makes it possible to snake around obstructions . . . permits the ideal arrangement of all elements of remote controls.

***Advantages** of Tru-Lay Push-Pull flexibility and simplicity are pictured below*

TRU-LAY PUSH-PULL — **MECHANICAL LINKAGES**

Simple
One Moving Part
Life-Time Service
Life-Time Accuracy
Low over-all Cost
Noiseless





Complex
Many Parts
Many Points of Wear
Increasing Back-Lash
Loss of Accuracy
Vibration
Rattles

Widely Used on Construction Equipment

• These accurate and dependable Remote Controls are used on a wide range of Construction Equipment . . . Tractors and their accessories, Power Shovels, Winches, Graders, Road Oilers, Dump Trucks, Snow Plows, Engine-driven Pumps, Crushers, etc.

On such equipment TRU-LAY PUSH-PULLS are used for the remote control of Transmissions, Hydraulic and Air Valves, Brakes, Clutches, Throttles, Chokes, Governors, Power Take-Offs, and on many other applications.

Our DATA FILE will answer your further questions
Write for a copy, without obligation

ACCO

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AMERICAN CHAIN & CABLE

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. . . New Products

Fire Locator-Alarm System Has Low Voltage, Low Cost

Low-cost and low-voltage installation wiring are among the advantages of an automatic fire locator and alarm system that has been designed particularly for factories, warehouses, small hotels and dormitories.

Fire is spotted by means of indicator lamps on a control panel, each lamp indicating an alarm zone. At the same time, audible alarms throughout the building warn the occupants to evacuate.

The system is designed to operate from stand-by batteries as well, so as to be available if light and power service are crippled. In addition, the system is electrically supervised. If a fault occurs in the wiring, a trouble bell keeps sounding until the fault is corrected.

Approved by the National Fire Protection Association and National Board of Fire Underwriters, the new locator-alarm system uses both automatic heat detectors and manual stations. Automatic heat detectors are available in two types—a fixed-temperature model with a UL rating of 400 sq ft, and a type combining fixed-temperature along with a rate-of-rise feature, given UL rating of 2,500 sq ft. The manual stations are of the single action type.

It is recommended that the system be tied in with a municipal fire alarm system or to a remote fire station. The locator-alarm meets the requirements of NFPA, NBFU's Pamphlet No. 72, New York State Multiple Dwelling Law and Pacific Ratings Bureau. EDWARDS CO., INC., NORWALK, CONN.

Abrasive Aluminum Tread Offers Nonskid Surface

Designed for use wherever hazardous slipping conditions exist, a new abrasive aluminum tread plate is said to provide sure footing even when covered with oil, grease or water. It is recommended for industrial locations, catwalks, bridges, trailer floors and sewage-disposal units.

The nonskid plate is rolled from ingot by a method that provides a fused aluminum oxide on one surface of the plate. According to the manufacturer, this abrasive layer will not separate from the plate, even in welding.

The tread can be shop fabricated by most commercial methods, including shearing, sawing, punching and drilling. It is corrosion-resistant. ALUMINUM COMPANY OF AMERICA, ALCOA BUILDING, PITTSBURGH 19, PA.

"FASTER FROM FOSTER"

PIPE PILES

FOR CAST-IN-PLACE CONCRETE PILES, FOSTER SERVICE ON SPIRAL-WELD PIPE CAN GIVE YOU BIG JOB SAVINGS

Big welcomes are being earned among contractors everywhere by the job advantages of Foster service on pipe for piling. Wherever the right product and dependable service pay off in savings, the full-job quantities which we can supply will allow you to get deliveries to your work schedule . . . thus avoid storage problems on the job site and avoid danger of work interruption. This stronger spiral-weld pipe is ideal for cast-in-place concrete piles. It has been driven 134 feet to refusal without damage or distortion—is lightweight, easy to handle, and drives straight without the use of a mandrel . . . can be supplied with driving points or plates mill welded, when required.

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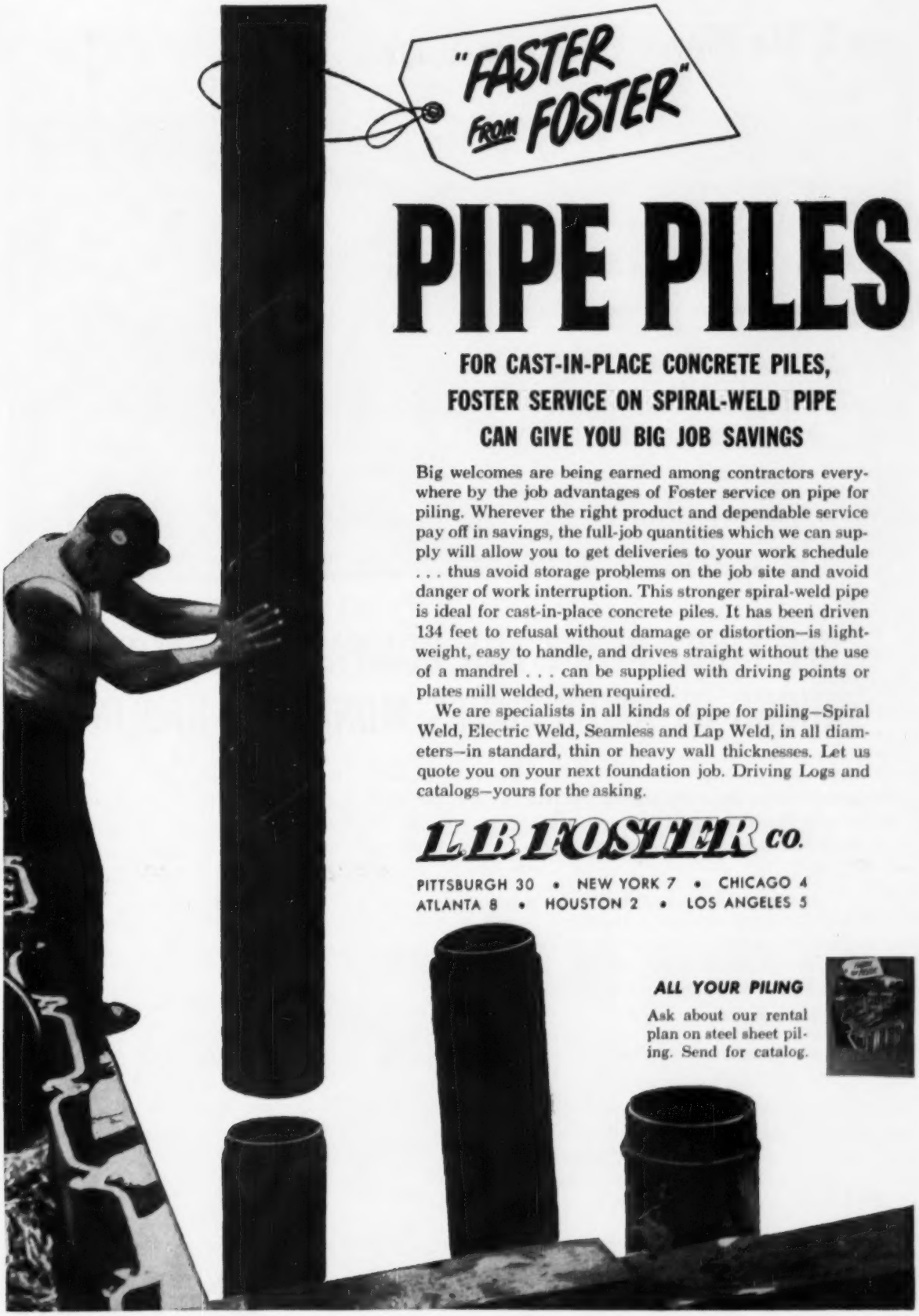

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GOFF KIRBY READY MIX COMPANY DISPATCHES TRUCKS BY RADIO, SAVES MONEY ON HAULING

Cleveland, Ohio Firm Operates 70 Trucks From Four Plants — Finds General Electric 2-Way Radio Helps Keep Costs Down!

Goff Kirby is one of Ohio's largest ready mix concrete firms. Its rolling stock is a familiar sight on construction projects throughout the Cleveland area. Last year, Goff Kirby Ready Mix Company was the only outside concrete supplier to deliver ready mix to the Ohio Turnpike project.

32 Trucks Have G-E Radio!

Nearly half the company's fleet is G-E radio equipped. These drivers are in constant contact with each of the four GK plants. Dispatch orders, changes, and special instructions by radio help make sure that loads get to a job on schedule. When breakdowns occur, the GK repair vehicle is on the scene in record time.

Radio Helps Keep Hauling Costs Down!

Edwin Harper, Goff Kirby president, reports that most of the cost of concrete is in the hauling charges. Typical rental of a concrete truck in his city is $11.50 per hour. By eliminating truck waiting time and driver overtime you save money. General Electric 2-way radio helps keep these costs down.

2-WAY MOBILE RADIO

Radio Can Help Your Operation, Too!

Goff Kirby is a typical example of progressive management in the concrete business. Your G-E Communications Counselor can tell you of others, show you how G-E Progress Line Radio can save you money. Call him in, or, write: *General Electric Company, Communication Equipment, Section X 2276-19, Electronics Park, Syracuse, New York.*

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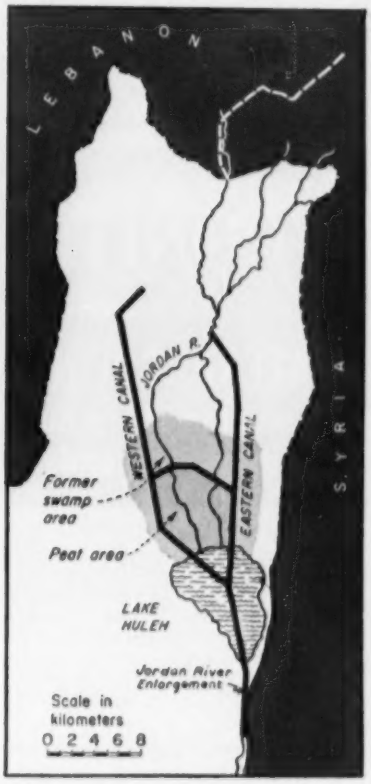
GENERAL ELECTRIC

SYRIA OBJECTED to Israeli's working on far bank of Jordan River, forcing contractor to erect dike in midstream so draglines could reach across.



Israel Drains 15,000 Acres Of Jordan River Swampland

Israel's largest land reclamation project to date—draining of 15,000 acres of Jordan River basin swampland—has entered its final phase, with completion expected this year.

American and Israeli contractors already have dredged 20 mi of main canals and enlarged a 3½-mi section of the Jordan River, this latter work requiring extraordinary methods because of intervention by neighboring Syrian military forces. Under construction are 6 mi of secondary canals which, when completed shortly, will allow establishment of 20 new agricultural settlements in this historic Huleh swamp area—eventually producing enough food to feed 100,000 people.

Subsidiary benefits include saving of 26,000 mg of water yearly that now evaporates, cleaning up of a favorite breeding place for malaria-carrying mosquitos, and the uncovering of 3,250 acres of rich peat deposits which will be used as fertilizer.

The Huleh Valley was formed together with the Jordan Valley and the Dead Sea as part of a deep rift that was opened in the Tertiary Age. Subsequent outpouring of basaltic lava from volcanos in the Huleh area formed a barrier across the valley in an east-west direction. The Jor-

CUTTER DREDGES opened 20 mi of canal through swamps. Dense papyrus made route location difficult, hampered construction.

DRAINED SWAMPLAND reveals rich deposits of peat.

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STRUCTURAL INTEGRATION METHOD.....

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NOT a surface coating

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Permeates the wall, oxidizes, expands

• IRONITE Waterproofing is different from ordinary water repellents because it is a metallic water resistant compound which actually permeates the porous surface of a wall...then OXIDIZES and EXPANDS to form an indestructible union with the surfaces to which it has been applied.

When you insist on IRONITE Waterproofing you get STRUCTURAL INTEGRATION in the wall. Once applied, removal is impossible without destruction of the underlying concrete or masonry.

For almost half a century, as a means of protecting their reputations for excellence, leading architects, engineers and contractors have specified IRONITE Waterproofing for all types of construction projects including:

Foundations	Molasses Tanks
Basements	Hot Water Tanks
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For further information on IRONITE WATERPROOFING write for your free copy of Bulletin No. 701 to: IRONITE COMPANY, Suite 729, 208 South LaSalle Street, Chicago 4, Illinois.

IRONITE COMPANY

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dan River eroded a channel through the barrier, but one not large enough to pass spring floods. This water has formed the Huleh swamp area.

Widening and deepening the Jordan River below Lake Huleh better to carry flood flows, got under way in 1951. This first stage involved over 1,000,000 cu yd of excavation, much of it solid basalt rock. Diamond drills were employed for blast holes while draglines and clamshells handled the broken material as well as the softer excavation.

Intervention by Syrian military authorities made prosecution of the work difficult. The Arab country protested the presence of construction machinery so close to its border, which in places was only 30 ft from the east bank of the Jordan (which lies entirely in Israel over the 3¼-mi section being enlarged). The Syrians also complained that a temporary gated control structure thrown across the Jordan to facilitate excavation interfered with irrigation activities downstream by its nationals.

The United Nations Security Council resolved the matter by forcing the Israeli's to abandon the dam and by restricting earthmoving equipment to the west, or Israeli, side of the Jordan.

The latter restriction obliged the contractor—an Israeli—to cast an embankment in the middle of the Jordan so his dragline could reach the east bank of the river.

Dredging of two channels north of Lake Huleh to supplement the capacity of the Jordan River comprised the second stage of the reclamation scheme. Connected by a 3-mi balancing canal, the two main canals varying in width between 60 and 90 ft, will receive Huleh swamp water plus flood waters from the Jordan. A diversion structure at the north end of the East Canal will confine normal flows to the Jordan River.

Construction Aggregates Corp. of Chicago performed this phase of the work, shipping two cutter dredges in sections from the U. S. So dense and high was papyrus growth that the 20 mi of channel route had to be staked out with the aid of 12-ft-high platforms spaced 600 to 900 ft apart.

More than 3,000,000 cu yd were dredged by the two units, one equipped with a 16-in. suction line, the other a 10-in. line. The equipment has been turned over to Israel for use in maintaining the channels.

An Israeli contractor is now engaged on the remaining work, cutting 6 mi of subsidiary canals through dry land to the main drainage channels.

All Huleh drainage work is under the supervision of Elhanan Brachyahu, chief engineer of the Jewish National Fund, financier of the project. The project fits into an overall national water resources scheme evolved by John S. Cotton of San Francisco for the Israel Water Planning Board, which will be detailed in a forthcoming issue of ENR.

Paraguay Water

Bids called for capital's first supply system

Plans have just been completed and bids are being sought this month for construction of the first water supply system for Paraguay's capital city of Asuncion.

Design of the $9-million water supply and distribution project for the South American city of 250,000 was done by Rader and Associates of Miami, Fla.

The complete lack of experience with water systems in Paraguay made it necessary to find a yardstick that would be suitable for determining the number of customers which would be served from the proposed water system. Electric consumption was adopted for this purpose; a careful study was made of 24,000 individual electric meters. This revealed a close correlation between the economic status of the individual consumer and the electric consumption.

Some 14% of the customers were found to be using between one and ten kilowatt hours per month, and 33% of the customers were using less than 20 kwh per month, as compared to the national average consumption in the U.S. of over 200 kwh per month.

From this study of power use it was determined that 135,000 persons would be served by the water system within the area of proposed construction. Of these, about 35,000 will be served without cost from strategically located public faucets; 14,000 house connections will provide service for the other 100,000 people to be served by the initial construction.

The water supply is to be taken from the Paraguay River, which is of excellent quality except for the turbidity that it carries. This river, with a minimum flow of 30,000 cfs. which is comparable to the Mississippi, is practically unpolluted since there is virtually no habitation along its course. The proposed treatment plant will

have an initial capacity of 15 mgd and can be doubled when required. It will consist of upflow sedimentation and chemical treatment units and rapid sand filters. The treatment plant is to be located about five miles above the city at a point where the river bank is stable. Water will be pumped from the plant through a 30-in. main to the distribution system composed of some 150 miles of pipe, ranging from 30-in. diameter down to 2-in. diameter.

The distribution system will be divided into three pressure zones, each being served by its own reservoir. Water is to be pumped from the treatment plant into the low zone comprising about 50% of the area of the city, re-pumped into the intermediate zone where it will serve approximately 40% of the area of the city and again re-pumped to serve the high zone, covering the remaining 10% of the area of the city.

Maximum use of local materials is contemplated in the construction of the system and all reservoirs, as well as parts of the treatment plant and other structures, are to be constructed of masonry.

As in the case of other such projects (this is financed by Export-Import Bank loan), expenditures for local labor and materials will be made in the Paraguayan currency (Guaranies).

John W. Greenleaf, Jr., partner in Rader and Associates, was stationed in Asuncion in 1943 while serving with the Institute of Inter-American Affairs.

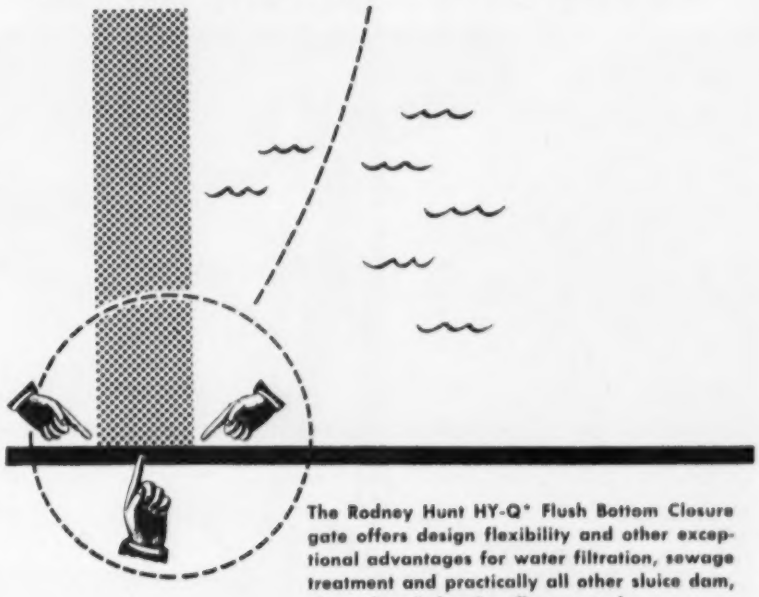
Venezuelan Bridge to Span The Lake Maracaibo Strait

Venezuela will spend an estimated $45 million on a combination bridge and tunnel to span the Lake Maracaibo strait.

Preliminary plans call for a 5.6-mi bridge to carry a highway and railroad across the strait between a point near Maracaibo on the western shore, and Palmarejo on the eastern side. For part of the distance the highway will become a two-lane tunnel to pass beneath the channel and avoid interruptions from ship traffic. The railroad will be carried across the channel on a lift bridge.

The project, together with the newly completed Maracaibo ship channel, will open up a rich agricultural and mineral region in western Venezuela. For instance, Maracaibo — Venezuela's second-ranking city with a population of nearly 300,000 — will be linked by rail and road for the first time with the rest of the country.

the HY-Q Sluice Gate seats flush on the bottom of the channel!



The Rodney Hunt HY-Q* Flush Bottom Closure gate offers design flexibility and other exceptional advantages for water filtration, sewage treatment and practically all other sluice dam, channel and chamber flow control.

1. You get maximum flow because there is minimum turbulence at the point of greatest head.
2. You get *complete* drainage naturally; no need for pumps and piping to get out water trapped behind a sill.
3. You get maximum clear opening because full flow at every raising of the gate sweeps the channel clear of silt and debris.
4. You get maximum hydraulic gradient because the HY-Q gate seats at the lowest level of the channel.

Send for a new 12-page catalog — No. 75 — giving complete description and specifications of the patented Rodney Hunt HY-Q Flush Bottom Closure Sluice Gate.

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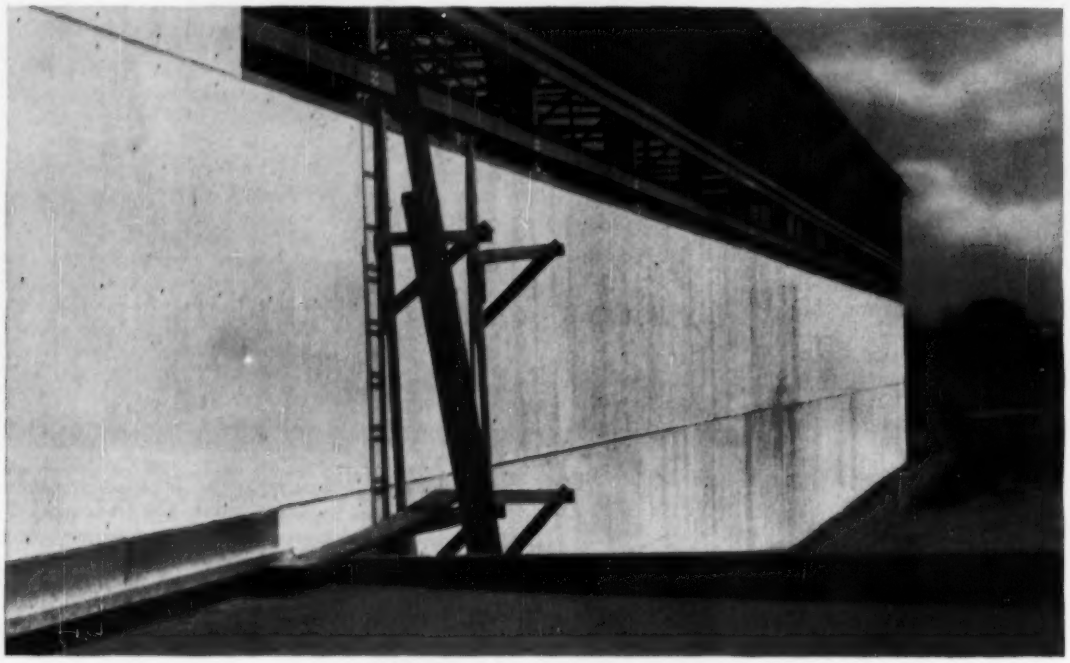
Johns-Manville TRANSITOP® Structural Panels meet the trend to modern panelized construction



Transitop Panels offer maximum coverage... minimum erection cost

THE MOST striking change in building construction methods in recent years has been the trend toward prefabricated building panels.

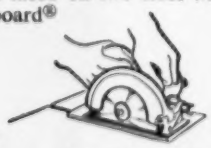
This is particularly true in the construction of panelized curtain walls for buildings, large and small. Although curtain wall construction in skyscrapers has been widely publicized, this method of construction is just as applicable to smaller buildings such as schools, hospitals, office buildings, motels and shopping centers. Today, paneled curtain walls probably exceed all other applications in popularity and are rapidly becoming the standard method of building construction.

Johns-Manville Transitop offers architects, designers and builders a simple and economical method of providing panelized curtain walls. Transitop is durable, weather resistant, requires minimum maintenance. As a curtain wall, Transitop provides high structural strength, reduces the dead load, increases usable floor space, provides adequate insulation and is easy to erect. Panels are easily applied over wood or steel framing.

The same advantages that make Transitop so suitable for panelized curtain wall construction also make it equally ideal for roof deck construction.

J-M Transitop is a complete 4′ wide by 8′, 9′, 10′, or 12′ long unit, in 1⅛″, 1⅛″, 1⅜″, or 2″ thicknesses. It consists of an integral impregnated insulating board core faced on two sides with Asbestos Flexboard® sheets.

- Facings of tough, weatherproof asbestos-cement Flexboard
- Core of integrally impregnated insulating board
- Waterproof adhesive bonds core to Flexboard sheets



- Transitop is cut to fit and installed with ordinary construction tools

For information on Transitop, write Johns-Manville, Dept. EN, Box 158, New York 16, N. Y.

JOHNS MANVILLE PRODUCTS

Johns-Manville

Weld-Repairs on Pumps Save Money

Instead of scrapping dredge pump impellers and casings damaged by rocks and debris from channel bottoms, Gibson & Cushman, Long Island (N. Y.) dredgers, have been welding the broken pieces with a 55% nickel, 45% iron electrode.

This method, first tried a year ago, has proved so successful that Gibson & Cashman estimate the cost of equipment saved already runs into thousands of dollars.

The cast impeller pictured had been operating in a pump on a hydraulic dredge. Constant abrasion wore off the ends of the vanes, crippling the pump. The impeller was practically new and had cost $1,200. It was either scrap the impeller or try welding.

To prepare the vanes, welders first cut out a section of each vane and set in a ½-in. thick piece of sheet steel. The leading edge of each steel insert had been beveled to give it a sharp edge, similar to a new vane. The only other preparation necessary was local preheating with a torch. The usual peening, chipping and wire brushing were performed after each bead of metal was run in.

Welding the vane edges in place took about 1½ hours, cost about $15, and was done right on the dredge. Total time for the welding repair was about two man-days, including preparation and balancing the impeller before putting it back in service.

Procedure used for repairing holes in pump casings varies slightly from that for rebuilding impellers.

Pump housing illustrated is made of semi-steel, weighs about 4,200 lb, costs $1,500. It had to be shut down when a crack about 6 in. long ran up the left side of the housing and a jagged hole about 5 x 6 in. was opened in the same side by a rock that burst through the casing just above the 12-in. discharge.

First, they formed a steel plate to fit over the hole in the housing. Before welding the plate to the casing, the welder preheated the area around the hole to about 450 F. Using two torches it took about a half hour.

Next the welder tacked the plate to the casing from the outside. Then he laid in four passes of 5/32-in. diameter electrode around the outside edges and ran in two passes of metal around the inside where the plate covered the break. To finish the job off, he put a small plate inside the hole, and filled in around it with nickel-iron weld metal. Finally, he resurfaced the repair on the inside of the casing with hardfacing rod.

One Way to Do a Design Job Fast

The problem presented Dec. 5, 1955 to Clarkeson Engineering Co. of Boston by the Massachusetts Turnpike Authority was straightforward enough—and deceptively simple:

Design a $6-million interchange for the turnpike at its busiest point—the intersection with Route 128 at Weston, 15 mi west of Boston—that will serve as terminus and principal entrance to the 123-mi cross-state road. And do the design simultaneously with construction, so that the facility could be open to traffic on the turnpike's target opening day of Nov. 15, 1956 (ENR July 12, p. 26).

Involved in the design were six entrance and exit ramps, a bridge over, and relocation of, the Charles River; somewhat delicate crossings of two aqueducts that supply all Metropolitan Boston with water; coping with the usual big-city maze of utility

DESIGN for this big interchange was completed in 3 months.

it's that simple!

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and other underground and overhead services; the threat of shortage of steel; and the desire to interfere as little as possible with the 40,000-vehicle-per-day traffic already using Route 128.

With the Authority, the contractor (B. Perini & Sons) and the calendar breathing over their shoulders, Clarkeson's engineers completed the design job in three months.

According to John Clarkeson, president, here's how it was done:

• **Photogrammetry**—Probably the biggest single saving of time is credited to use of photogrammetry. Since about 75% of the site had been mapped from the air in previous surveys, the firm could start design within 48 hours of receipt of its contract—Clarkeson figures a saving of about three months over what would have been necessary for field survey parties. The aerial photographs had a scale of 50 ft to the inch, with 2-ft contours—and were found to be "extremely accurate" on subsequent field check, the firm head said.

• **Machine work**—Machine calculations were used to arrive at quantities, rather than the more conventional cross sections.

While admittedly not as accurate as the cross-section method, Clarkeson says, that when checked later, the quantities determined by the machine system "proved to be well within 8% of actual quantities." "And we saved about 1,800 man-hours of time," he adds.

The formula for the earthwork quantities was: $(fh^2 + CH)d/27$, where: f equals slope factor; h equals average depth of cut or fill; c equals width section across top of fill or bottom of cut; and d equals distance between stations. Overall quantities involved in the estimating were 380,000 cu yd of excavation; 287,000 cu yd of fill.

• **Graphics**—The use of graphic methods in making computations and drawings, using accurate scales, also gets large credit. Edge profiles were worked up in large scale and smoothed out graphically.

Profiles used in contract drawings showed only pertinent information, with grades only at points of vertical curvature, points of vertical intersection and points of vertical tangencies—thus eliminating a great deal of drafting. The points of intersection were scaled off from the photogrammetric prints.

And in all cases where it was felt that drawings could be better done in the field this practice was followed. Many drawings not considered absolutely necessary for the control work were not made at all.

• **Cooperation**—Close cooperation between Clarkeson, Perini and the Turnpike's consultants—Howard, Needles, Tammen & Bergendoff—also gets a big share of credit.

A negotiated contract had been awarded Perini within two months of the award to Clarkeson. There began immediately a series of regular conferences between the two: The contractor outlining to the engineer a general schedule of how he planned to proceed with construction and which sections he would like to work first; the engineers concentrating on those sections as a matter of priority.

Additionally, Clarkeson said, the contractor made many suggestions as to types of design that would permit less expensive and faster work. One example was Perini's suggestion that caissons be used instead of sheet piling for foundations on one of the bridges; others included joint efforts to standardize design to make for easier and less expensive work. Additionally, the contractor even assisted the engineer in determining location of suitable excavation areas to cut need for high-priced borrow, and dug test pits.

• **Decisions**—Out of these conferences—now including Turnpike Authority representatives and the consultants—came a series of bi-weekly conferences to settle problems as they arose. Also included, when possible, were engineering officials of the 14-odd utilities whose facilities were involved in the work, and whose approval and cooperation was necessary to clear obstacles.

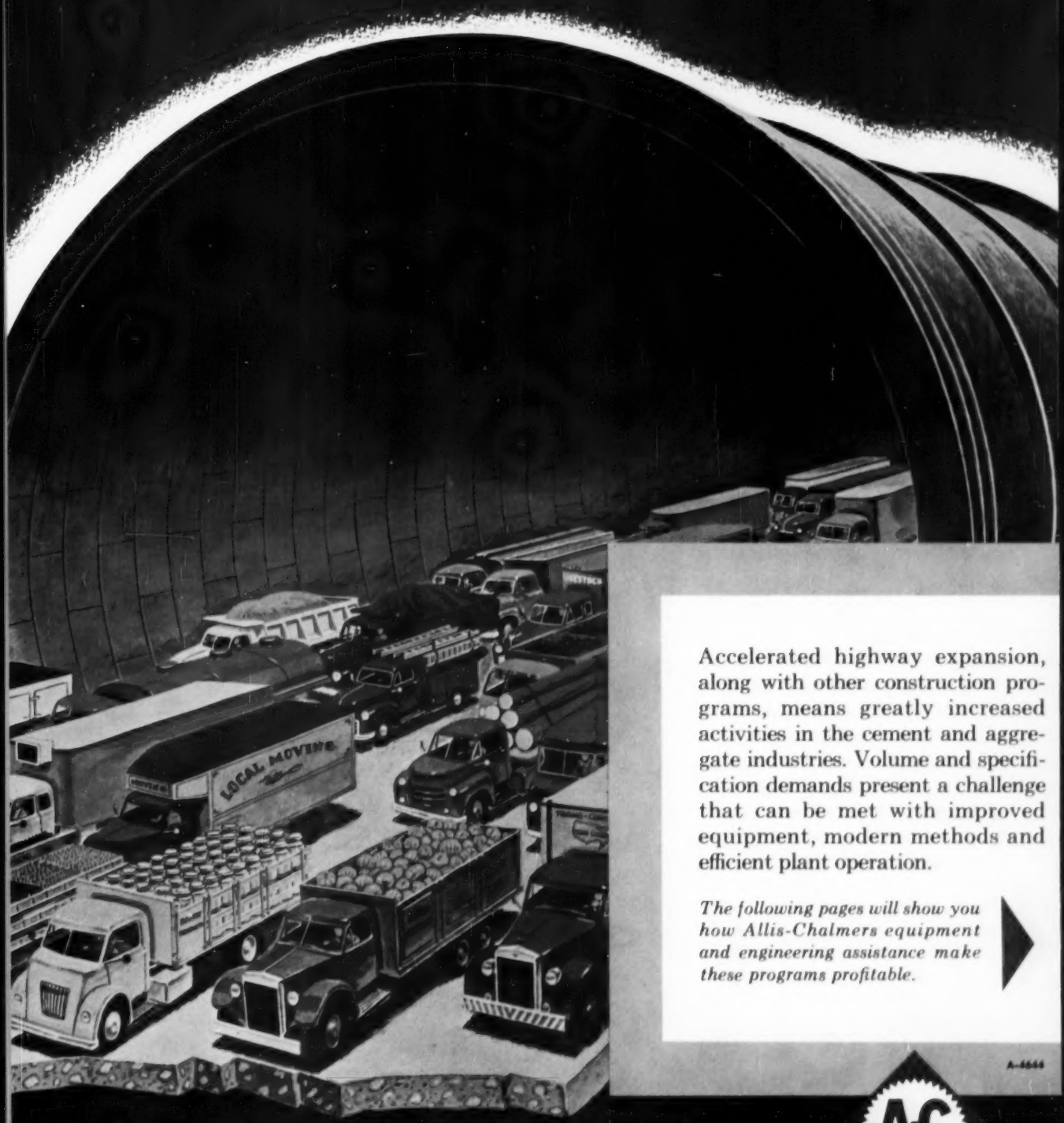
• **Controls**—All calculating was done by two-man teams—each man working independently, then checking his results against those of his partner.

Field information was indexed in triplicate as soon as received, with separate indexes kept by highway, bridge and drainage divisions so that each department was up to date at all times on all information.

Coordination of all phases of work was handled by the field resident engineer.

Because many drawings had to be released before they were completed—so that work could proceed and for ordering of materials, a control setup was established to minimize confusion and error. Under this system: All

WANTED – More Cement ...More Aggregates



Accelerated highway expansion, along with other construction programs, means greatly increased activities in the cement and aggregate industries. Volume and specification demands present a challenge that can be met with improved equipment, modern methods and efficient plant operation.

The following pages will show you how Allis-Chalmers equipment and engineering assistance make these programs profitable.

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How ALLIS-CHALMERS Helps

ENGINEERING HELP for plant operators and consultants

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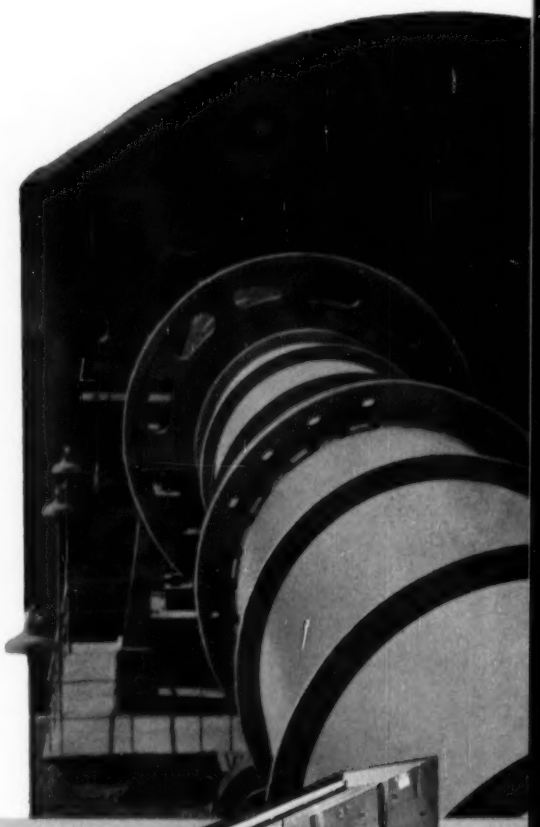
Service Everywhere . . . At All Times — Allis-Chalmers interest in your problems does not end with the installation of equipment. Laboratory facilities, periodic check-up, maintenance and fast emergency parts service are yours continuously through your nearby Allis-Chalmers representative.

Allis-Chalmers Rotary Kilns for Cement and Lightweight Aggregate Production

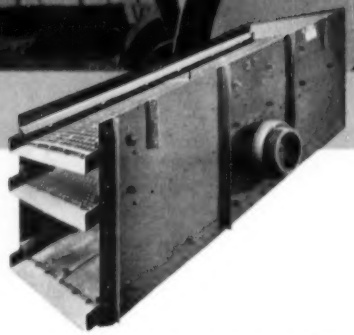
Cement operators have long acknowledged the superiority of Allis-Chalmers rotary kilns—superiority that is reflected in long-term dependability as well as low-cost operation and maintenance.

Efficient kiln design is a result of Allis-



Hydraulically Adjusted Crushers Afford One-Man, One-Minute Product Control

Most Allis-Chalmers gyratory crushers are supplied with hydraulic adjustment which provides precise product size control by the flick of a finger. Compensation for wear and emergency unloading are controlled in the same manner. Other Allis-Chalmers crushers include a broad range of jaw crushers, roll crushers, and multi-impact hammermills.



Vibrating Screens for Every Application

Allis-Chalmers builds a complete line of vibrating screens, including units for scalping, medium and fine separation, wet or dry screening, rinsing and dewatering.

Cement and Aggregate Plants

★ *Increase Volume*
★ *Meet Specifications*

Chalmers specialized engineering and the experience gained in building and applying hundreds of kilns in the last 50 years.

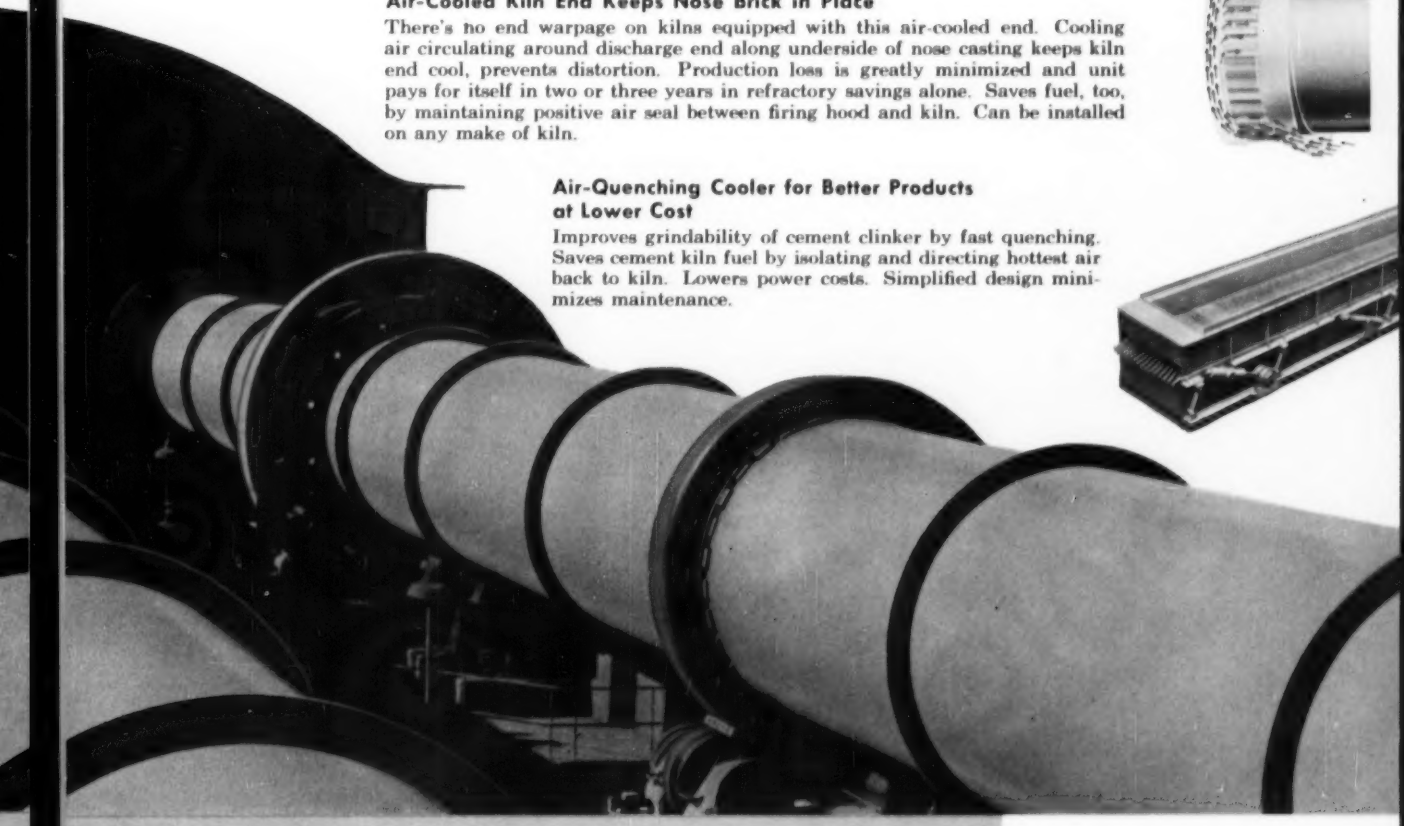
Allis-Chalmers all-welded rotary kilns are built in standard and special sizes for a wide variety of uses, including cement manufacturing and the production of lightweight aggregates, lime, refractory materials, fertilizers and chemicals.

Air-Cooled Kiln End Keeps Nose Brick in Place

There's no end warpage on kilns equipped with this air-cooled end. Cooling air circulating around discharge end along underside of nose casting keeps kiln end cool, prevents distortion. Production loss is greatly minimized and unit pays for itself in two or three years in refractory savings alone. Saves fuel, too, by maintaining positive air seal between firing hood and kiln. Can be installed on any make of kiln.

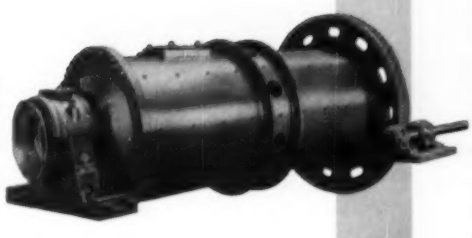
Air-Quenching Cooler for Better Products at Lower Cost

Improves grindability of cement clinker by fast quenching. Saves cement kiln fuel by isolating and directing hottest air back to kiln. Lowers power costs. Simplified design minimizes maintenance.



Grinding Mills for Profitable Production of Specification Sand

Because of stringent specifications, decreasing natural sand reserves and local variations in sand and gravel, operators are "manufacturing" sand in Allis-Chalmers rod mills. These mills are simple to operate. Maintenance is low. Allis-Chalmers also manufactures many other types of mills used wherever finely ground materials are produced, including multi-compartment mills for grinding cement raw materials and clinker.

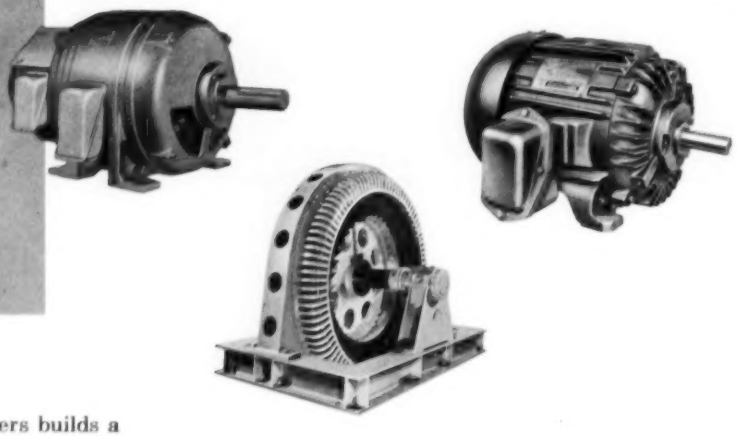


***In addition to processing machinery, Allis-Chalmers supplies the required**

ELECTRICAL EQUIPMENT

. . . machinery and equipment designed to work together, backed by undivided responsibility.

ALLIED ELECTRICAL EQUIPMENT



MOTORS — Allis-Chalmers builds a complete line of polyphase squirrel-cage and wound-rotor induction motors for every industrial use. These, as well as synchronous and direct current motors, are available with electrical and mechanical modifications to meet a wide variety of applications. Mechanical modifications obtainable include drip-proof, splash-proof and totally-enclosed fan-cooled construction in vertical as well as horizontal types. Many ratings are available with flange-type construction.

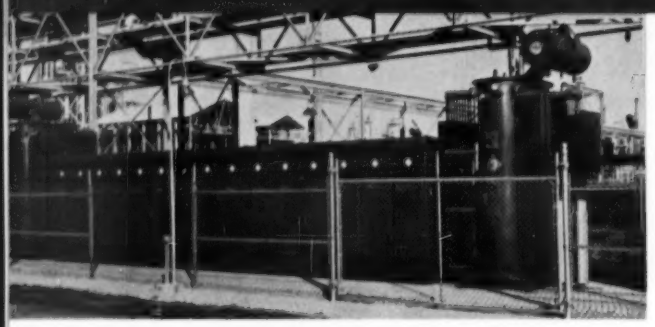
Squirrel-Cage Motors — Most used of all motors is constant speed three-phase cage motor. Construction simplicity makes initial cost and maintenance low.

Wound-Rotor Motors — Used for constant speed duty requiring frequent reversing or starting under heavy load; high starting torque. Also suitable for adjustable-varying speed duty.

Synchronous Motors — Applicable to most constant speed drives. Operating characteristics include high efficiency and the ability to improve system power factor. Widely used for grinding mills, either through magnetic clutches or as direct-connected high torque motors.

Direct Current Motors — Occasionally used for adjustable-speed service, such as for kiln drives.

ALLIS-CHALMERS



UNIT SUBSTATIONS

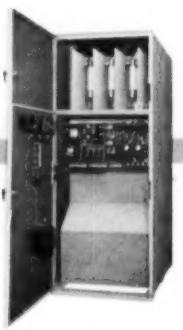
Switchgear is the key to power continuity. In the substation illustrated, double-ended switchgear is combined with duplicate Allis-Chalmers power transformers.

Allis-Chalmers switchgear offers the following advantages:

Saves Space — Compartments have been designed to permit adding special transfer bus or ring bus without adding cubicles.

Saves Cost — Elimination of duplicate facilities or extra cubicles cuts equipment cost.

Saves Time — Dry-type bus joint insulation simplifies adding or removing cubicles. There are no compounds to melt.



CONTROL

Allis-Chalmers can supply motor control for practically every application. Shown is the Type H Control for 2300-5000-volt motors. Starter is provided with air or oil contactor. Meters, relays, fuses, switches — everything needed for the complete protection of man, motor and machine is conveniently installed in an attractive, easy-to-install cubicle.

I would like bulletins on

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(Type of equipment)

ALLIS-CHALMERS
Milwaukee 1, Wisconsin

Explanation of process or problem. .....

.....

.....

Name .....

Title ..... Company .....

Address .....

City ..... Zone ..... State .....

A-4644

concerned were supplied with a key drawing and two key charts; drawings released for the first time were stamped "original issue"; when revisions were necessary, a "revision warning notice" was sent to all; and revisions themselves were then issued, with an accompanying "revision notice' 'so that any party that did not receive the actual revised drawing could call for it.

• **Steel detailing**—Because of fear of steel shortage that might be further aggrevated by delays incident to design, a first priority was given to the steel work. The goal set was to complete one third of the plans and details by January 15, another third by February 15 and the final third by March 15. The engineering firm, in fact, delivered 80% of all steel plans —complete for rolling schedules, shop drawings for full fabrication—by January 15, the remaining 20% by February 15.

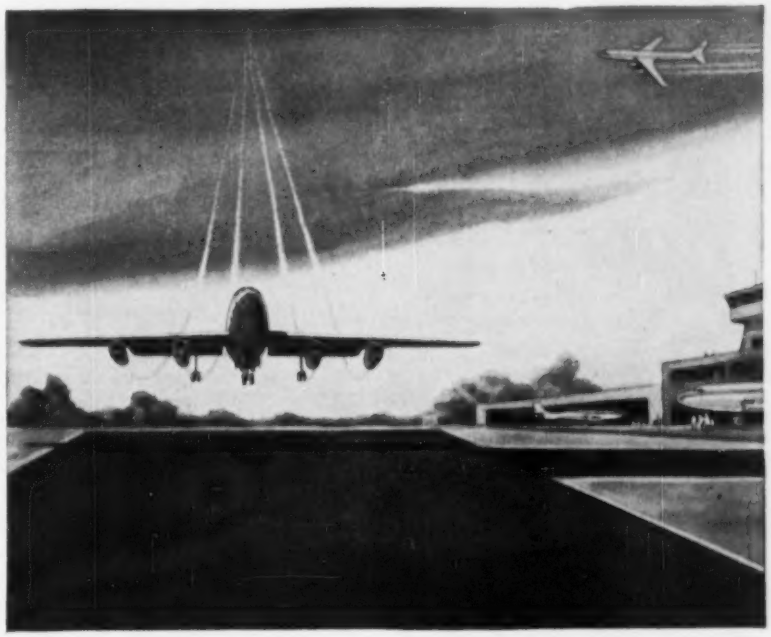
• **Staff**—Reviewing the work, Clarkeson comments that although the staff working on the project was larger than would have been needed without the speed requirement, he believed it to have been much smaller than if shortcuts had not been taken into account. For highway plans, a total of 19 men was used; an additional 23 men worked on bridge and structural work.

Structural design was handled by William A. Henderson and S. A. Wigon; drainage and utilities by S. P. McAfee and R. S. Renstall; highway design by T. A. McManus. Project engineer is Robert E. York. Photogrammetric work was supplied by Lockwood, Kessler & Bartlett, of Syosset, N. Y.

Model Used to Visualize Office Space in Building

To aid his department and interested Congressional groups in visualizing the space allocations in the State Department's projected $50-million office building in Washington, D. C., Thomas S. Estes, Deputy Assistant Secretary for Operations, came up with a new type of scale model.

Each floor of the 7-story 1,200,000-sq-ft building is represented by a separate layer of wood, with the floor plan pasted on. Floors can be lifted individually or in groups to expose the layout of a particular floor. Small wood pegs or keys keep adjacent floors in register. Estes uses several colors along the floor edges to distinguish space allocations by department or agency.



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Get set for them with Flintkote Paving Products!

Jets . . . jets . . . jets! They're in service . . . in production . . . on order. And airfields . . . both commercial and military . . . must be tailor-made *now* to handle them.

FLINTKOTE'S FLINTBINDER* C-2 was especially designed for critical areas of airfields serving jet-powered aircraft. It is a specially compounded hot-mix, tar-rubber binder for jet-fuel-resistant, flexible pavement.

Used as a surface course over asphaltic or portland cement concrete, Flintbinder C-2 makes it possible for runways, taxiways and aprons to stand up successfully under the spillage of jet fuels.

And to prevent jet traffic from deteriorating joints in *concrete* pavement, seal these joints with the jet-fuel-resistant, hot compound . . . FLINTSEAL* JFR. This flexible, resilient joint sealer adheres to concrete and remains extensible and compressible at high and low temperatures. Keeps out moisture and incompressible debris. (Meets Fed. Spec. SS-S-00167.)

TACKSEAL† is Flintkote's new rubber-bearing, hot-applied coal-tar base material for use as a tack coat and as a surface sealer. Also available is FLINTAR† coal-tar pitch emulsion (meets Fed. Spec. R-P-00355). Both are resistant to oil, grease, engine cleaning compounds and, of course, jet fuel.

Write for technical data and literature.

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Colors ... Hardens ...
Beautifies ... Dustproofs!

Just sprinkle on the leveled and floated fresh concrete surface, then work into the surface with a wood float and finish with a steel trowel. You'll be amazed at the brilliance and depth of the two beautiful colors: Tile Red and Spanish Green.

Remember ... ART-ROC is not just a surface film, but color that's built-in to stay . and it's so easy to use!

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Research

Asphalt Durability

New instrument predicts life-span of pavements

A new instrument that provides the first accurate predictions of the life expectancy of asphalts has been developed by scientists at Shell Development Co., Shell Oil research affiliate.

The instrument—a sliding plate microviscometer—measures resistance to flow under carefully controlled temperatures and shear forces. Its accurate measurements are expected to provide uniformly superior roads by permitting selection of asphalts with proper viscosity and great resistance to change.

The key to precision in the test is that measurements are made on an extremely thin film of asphalt—about a hundredth of a millimeter thick. By using such thin samples, tests can be run under conditions similar to those existing in ordinary pavements.

The chief advantage of the instrument, according to Shell asphalt engineers, is that results indicating the durability of the sample are expressed in absolute physical units—data never before attainable.

To gage the asphalt's durability, the viscosity of the film is measured, subjected to aging processes, then measured again.

In making the test, a minute quantity of asphalt is put between two polished glass plates and pressed out to form a thin film. One plate then is moved across the other and the sample is sheared. The shearing force and the temperature are carefully controlled and recorded.

The movable plate is attached to a wire that is connected to a simple balance beam pivoted on agate bearings and polished steel knife edges. Weights hung on the beam provide the shear force. Temperature is controlled by a water bath.

An electronic circuit is used to follow the movement of the glass plate. This movement may be measured directly by reading the micrometer on the instrument. It also is possible to mark the displacement of the glass plate on a millivolt recorder.

The microviscometer, now available for general use, is being manufactured by Hallikainen Instruments, Berkeley, Calif.

Glued Splices Show Strength In Wood Beam and Arch Tests

Splices in glued-laminated wood arches and beams may be simpler and slimmer in the future, according to tests conducted by Fred Werren, an engineer at the Dept. of Agriculture's Forest Products Laboratory, Madison, Wis.

Under sponsorship of the Navy's Bureau of Ships, Warren conducted bending and shear tests to destruction on beams and arches which were spliced by means of glued scarf joints only. He reported that the splices had no apparent effect on failure.

Present practice in splicing continuous members is to use timber connectors, bolts, and wood or steel splice plates. Glued scarf joints are used only for splicing individual laminations (up to 1½ in. thick) before they are laid up in the glue press, and most specifications restrict the number of these joints allowed in any one cross section of a member.

The beams tested were 6x6 in. in cross section and had splice areas exceeding 400 sq in. The arches were considerably larger, having splice areas of more than 1,000 sq in. All test members were white oak.

Following the bending and shear tests, specimens from the splice areas were subjected to accelerated delamination tests, consisting of several cycles of wetting and rapid drying. Results indicated that the joints will be durable under service conditions.

Iowa Puts All Its Road Laws in One Book

All of the highway, road and street laws in 21 volumes of the Iowa Code have been compiled in a handy pocket-size book.

The compilation has been published as a research project of the Iowa Highway Research Board under authorization of the Iowa State Highway Commission. Special Assistant Attorney General Norman Erbe and Daniel T. Flores, a member of the commission's legal department, carried out nearly 12 months of research to complete the project.

The book—expected to prove especially valuable to engineers and contractors as well as bonding houses, attorneys and government officials—contains 1,011 pages of reference material with 42 pages of index. In addition to the laws it includes references to Supreme Court opinions and opinions of the attorney general.

BASE COURSE DENSIFICATION at its *QUICKEST* and *BEST*

6 COMPACTING UNITS IN WORK-HEAD for maximum productivity in straight-away work. Left: Compacting sand fill in a bridge approach . . . another phase of its wide range utility to paving contractors.

4 COMPACTING UNITS just fit this widening job-change required in only a few minutes.

3 COMPACTING UNITS in tandem and staggered, suits this job ideally — a quick and easy change.

1 COMPACTING UNIT fitted with operating handle and narrow base. Just right for the otherwise unreachable spots.

3 COMPACTING UNITS in twin hook-up — self-propelling. One man readily compacts up to 4000 sq. ft. per hr. in 10" layers.

Plus UNMATCHED ON-THE-JOB *ADAPTABILITY!*

For consolidating granular soil sub-bases and the base courses of sand, gravel, rock or slag in waterbound and penetration macadam construction, there is just nothing that compares with the Jackson Vibratory Multiple Compactor. It not only does the straight-away work in only half the time required by equipment of other types, but is so versatile, so easily adaptable on the job that it can be used to great advantage for widening projects of any width and getting into places other equipment can not touch. As may be noted in the illustrations, any number of compacting units may be used in the workhead (up to 6, which covers 13′, 3″) to exactly fit the job at hand. Units may be towed at the side or fitted with operating handles and used as individual, self-propelling compactors. Quickly interchangeable bases from 12″ to 26″ are also available for compacting in trenches, etc.

For compacting granular soil fills of all kinds, the Jackson Multiple Compactor is a terrific cost saver and progress expediter. *It's the predominant medium of consolidation used on the outstanding paving jobs in the country today.* See your Jackson distributor for complete details. We will gladly furnish his name, and literature on request.

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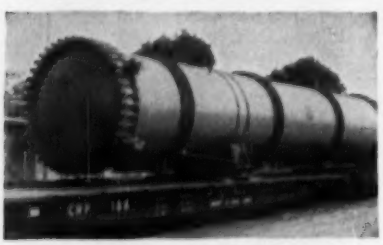

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We also design and fabricate elevated tanks, acid tanks, dye-vats, digestors, standpipes, storage tanks, etc. Write for latest COLE catalog —*Tank Talk.*

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- STANDPIPES

Men and Jobs

Asphalt Institute Founder Honored by Fellowship Grant

A $3,000 fellowship honoring Herbert Spencer, a founder and former president of the Asphalt Institute on his retirement from the institute, has been established at Cornell University by the Esso Standard Oil Company.

The Herbert Spencer Fellowship will be awarded to a graduate student, selected by the University, for study and research on some phase of bituminous materials. The 1956-57 recipient is Richard F. Sparlin, of Laurel, Montana, a June graduate of Montana State College. He will enter Cornell in the Fall to work for a master's degree in civil engineering.

Spencer was one of Esso Standard's specialists in the asphalt field for 29 years. He was named as first full-time president of the Asphalt Institute in 1941 when he retired from the company. He retired again on July 1 as division engineer of the institute's Atlantic-Gulf Division, but will continue as a consultant.

Army Names Engineer To Head Traffic Section

Robert M. Wray, for the last 10 years a traffic engineer with the Kentucky State Highway Department, has joined the office of the chief of transportation, Department of the Army, in the newly created post of traffic engineer.

According to available information, he will be the first traffic engineer hired by this department.

A native Virginian, Wray spent five years as district traffic engineer at Louisville, and five years in the Frankfort office. Previously he worked as a civil engineer with railroad and private industry. In his new job, Wray will analyze road conditions in the U. S. and in all areas of the world in which Army vehicles must operate.

Deputy Director of JCA Gen. H. W. Ehrgott to Retire

Brig. Gen. Herbert W. Ehrgott, USAF, deputy director of the Joint Construction Agency which manages U. S. military construction in France and certain other European areas will retire on July 31.

A veteran of more than 30 years of commissioned service, General Ehrgott spent 21 years with the Corps of Engineers. Prior to his present assignment with the JCA, he served for a year in Headquarters, USAF, as deputy to the Assistant Chief of Staff, Installations. During part of World War II, he was staff engineer for the Ninth Air Force in the Middle East and subsequently was appointed Chief of Staff of the Engineer Command, USSTAF. He served in the latter post throughout the European campaigns.

A West Point graduate, General Ehrgott also holds a mechanical engineering degree from Masachusetts Institute of Technology. His post-retirement plans are indefinite.

Col. M. P. Barschdorf Named Vicksburg District Engineer

Col. Milton P. Barschdorf, Assistant Division Engineer, Lower Mississippi Valley Division, and secretary of the Mississippi River Commission, has been assigned as District Engineer, Vicksburg District, Corps of Engineers. He will succeed Col. Thomas B. Simpson, who has been District Engineer at Vicksburg since 1953.

Colonel Barschdorf is a 1938 graduate of the U. S. Military Academy. During World War II he served in Panama, North Africa and Italy.

(*Men & Jobs continued* on page 74)

Chief Engineer for N. Y. Water

Stanley M. Dore has been named to succeed K. R. Kennison as chief engineer of the New York City Board of Water Supply. Prior to accepting this key post, he served for four years as deputy chief engineer of the board. His earlier experience includes positions of a similar nature in the Alleghany County Sanitary Authority. Metropolitan District Water Commission of Boston, and the City of Providence Water Supply Board.

Why this new paver is so simple to operate!

There are two big reasons why this new PIONEER VIBROmatic paver is the easiest to operate . . . reasons why the operator can do a full day's work with much less fatigue . . . reasons why you get a smoother, a more compact, a more uniformly dense mat faster than with any other paver.

FIRST — Simplicity of controls

Finger and toe-tip controls are air-over-hydraulic which means the operator can actuate all controls effortlessly. Steering is accomplished with the hand controls and material feeding with the foot controls. There's an easy acting master clutch lever handy to disengage all power when necessary. And when the operator needs to control from the other side of the paver, he picks up the controls and moves them over to the other side in seconds' time . . . the seat too!

SECOND — Unobstructed visibility

The operator has absolute unobstructed visibility of the entire paving operation. He can see the steering pointer . . . the material in the hopper . . . the distribution of material by the screws . . . the oscillating screed . . . the action of the compactor . . . and the mat being laid.

Other outstanding features

Other features include abundant power, speed and capacity for laying all courses . . . better initial compaction with fewer voids which require less rolling . . . and sensible design which makes maintenance simple.

For more information write the Pioneer Engineering Works, Inc., Minneapolis 13, Minnesota (subsidiary of Poor & Co., Chicago) or see your PIONEER Distributor.

VIBROmatic®
BITUMINOUS PAVER
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On-the-job photograph of an operator "taking it easy" with the new PIONEER VIBROmatic Paver.

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INTO THE FUTURE...
OHIO TURNPIKE
...with miles and miles of
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CAST IRON PIPE
built for
more than 100
years of service
Eight "Service Plazas" along the 241 miles of the new Ohio Turnpike might be called "cities in miniature" —providing the many services that traveling America wants or needs for its cars, their drivers and passengers. Each has its own self-contained water system; drawing its water from adjacent wells or, in two instances, from nearby towns.
Clow Cast Iron Pipe was used in the water supply, treatment, distribution and sewage disposal systems—because today more than ever before, Clow's precise, modern production methods and advanced, exacting control of metallurgical quality give forward-looking engineers added assurance of permanence.
Invite a CLOW man in to talk with you as soon as pipe appears in your plans.
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. . . Men and Jobs

Design Director Appointed For Kentucky Highway Dept.

W. B. Carrington has been named as director of design for the Kentucky State Highway Department. He replaces J. J. Pollitte, resigned in June.

A native of Kentucky, Carrington graduated from the University of Kentucky College of Engineering, and has been employed by the State Highway Department since 1932.

Men and Job Briefs . . .

• **Careers**—The British Columbia Highways Department names **Fred T. Brown** to succeed **Neil McCollum** as chief engineer . . . **J. Carl Mc Monagle,** who has been chief of the Michigan State Highway Department's planning and traffic division will leave the department on August 1 to become assistant director of Michigan State University's traffic center.

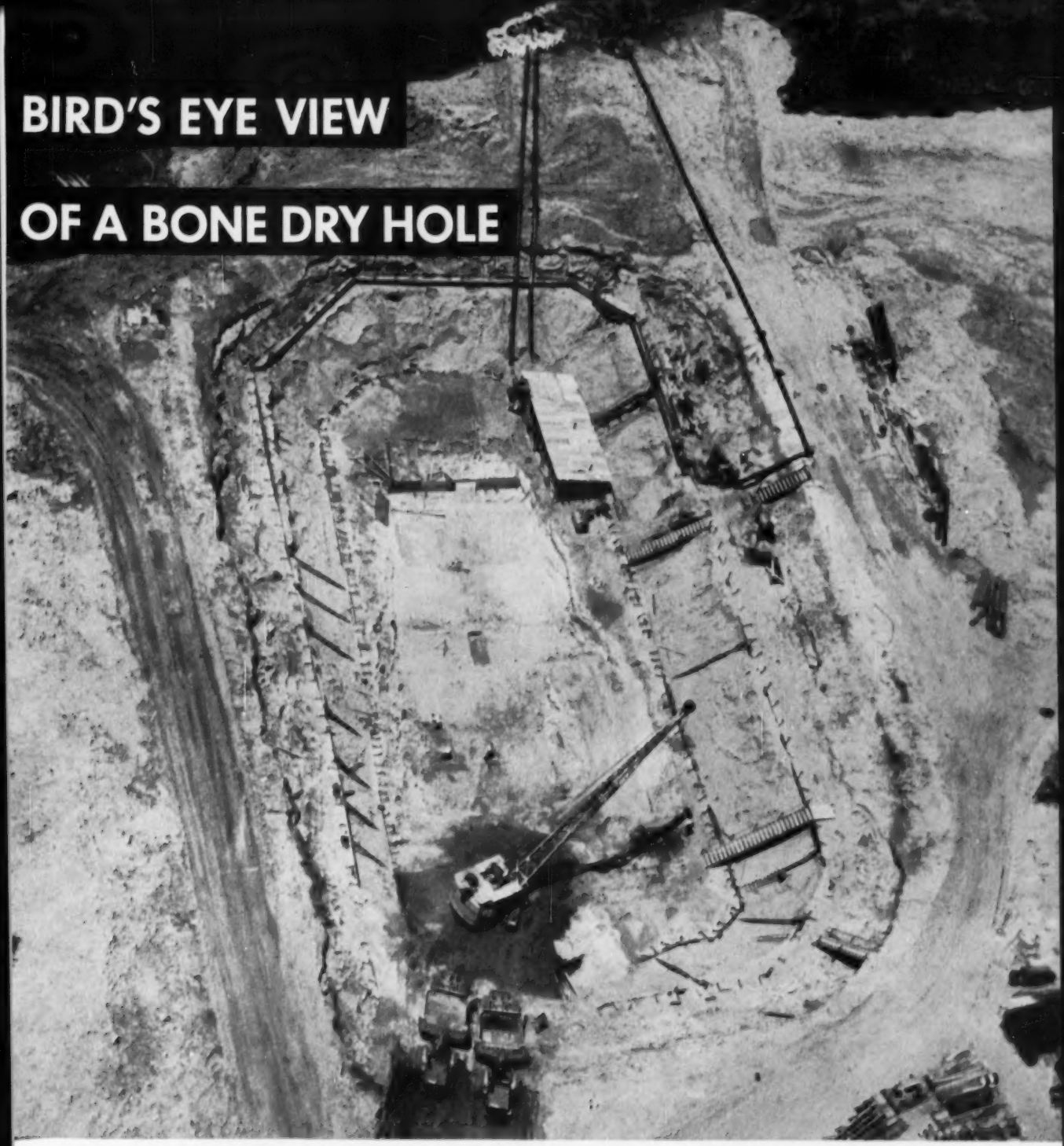
Harold J. Dickinson of Fresno, Calif., chief of the San Joaquin Valley operations office of the Corp of Engineers, Sacramento District, has left government service to be construction engineer for the consulting firm of Tipton and Kalmbach, Inc., of Denver, Colo. . . . **Ross L. Clark,** sewage treatment engineer of the City of Toronto, Canada, is appointed commissioner of works for the Municipality of Metropolitan Toronto.

• **Business**—The Bay State Dredging & Contracting Co. in Boston, the marine division of B. Perini & Sons, Inc., names **Charles A. Richardson** as vice president and general manager. He has been associated with the Merritt-Chapman & Scott Corp. for the last 21 years, most recently as vice president in charge of the New York marine and heavy construction division.

Howard R. Gould, former Midwest manager for Spencer, White & Prentis, Inc., in Detroit, has been appointed vice president of the firm, with offices in New York City. **James C. Nelson,** who has been in Toronto with Spencer, White & Prentis of Canada, Ltd., will take over the Midwest post.

Two San Francisco contracting firms **Bishop, Younger Bradley** Co.; and **Peter O. Mattei** Construction Co. have consolidated to form Bishop-Mattei Construction Co. effective July 1.

BIRD'S EYE VIEW OF A BONE DRY HOLE



Two-stage MORETRENCH WELLPOINT SYSTEM keeps 38' of water well below subgrade on pump station in Sayreville, New Jersey. Material—fine to coarse sand and clay. For expert pumping—*at a saving*—get Moretrench on your job! For full details, call our nearest office.

Contractor: Wallace J. Wilck, Inc., Perth Amboy, N. J.
Owner: Middlesex County Sewerage Authority, New Jersey.
Engineer: Bogert & Childs, New York.

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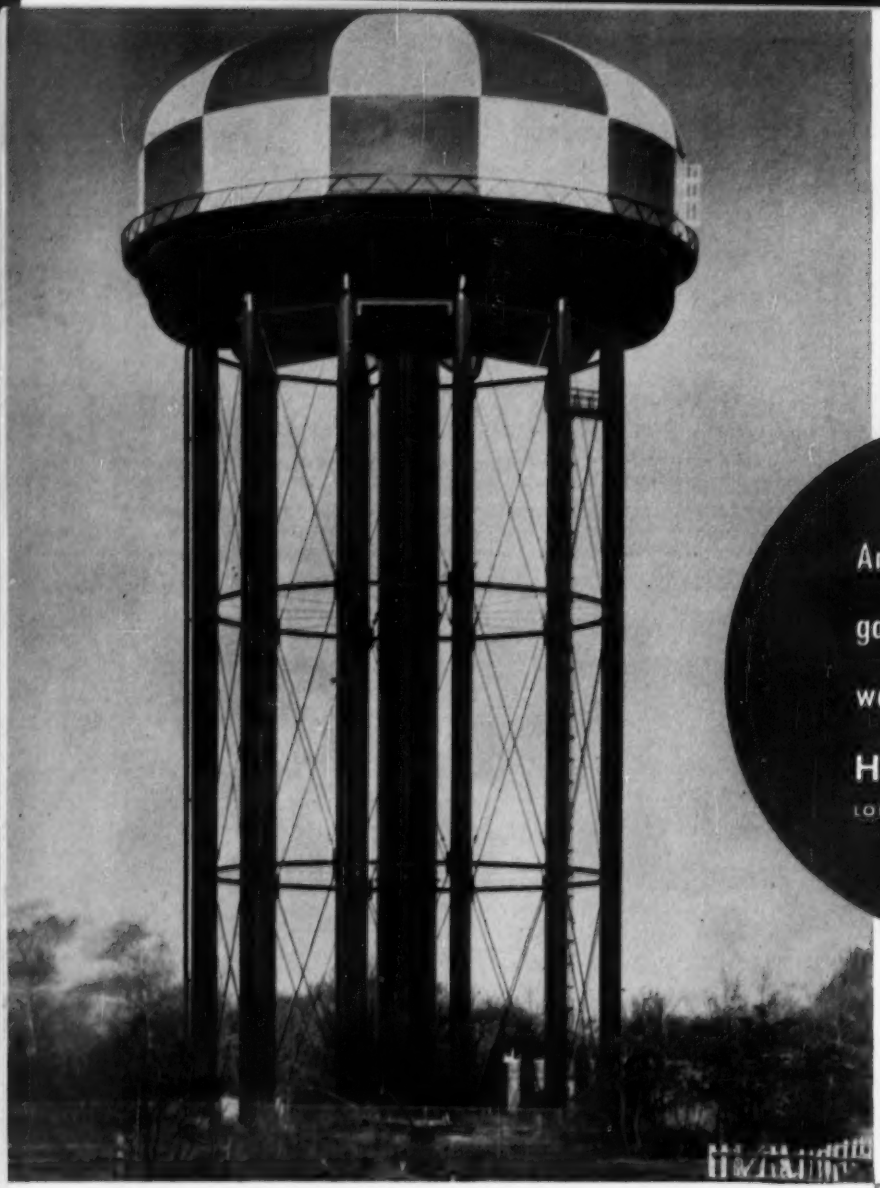
Western Representative: Andrews Machinery of Washington, Inc., Seattle 4, Washington

Canadian Representative: Geo. W. CROTHERS Limited, Toronto, Ontario

Brazilian Representative: Oscar Taves & Co., Ltd., Rio de Janeiro



Another 1,500,000 gallons of "certain-sure" water service for **HEMPSTEAD** LONG ISLAND, N. Y.

1951

Elevated Steel Tanks by

PITTSBURGH-DES MOINES

Latest of the many PDM Elevated Steel Tanks towering over Long Island's level terrain is this 1,500,000-gallon Radial Cone installation for Hempstead. 88 ft in diameter, the tank has a headrange of 35 ft and is on a tower 135 ft to bottom of capacity. Shown at right is an earlier million-gallon PDM tank of the same design, built for Hempstead in 1951.

● Write for our new Modern Water Storage Catalog.

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SEATTLE.....522 Lane Street
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PDM
ELEVATED STEEL TANKS

Obituaries

John H. Wilson, 84, engineer-mayor of Honolulu, Hawaii for 17 years, whose colorful career as a politician, contractor and civil engineer spanned a great deal of the islands' history from the overthrow of the old monarchy to the bustling present, died at Honolulu July 2.

A classmate of Herbert Hoover at Stanford University, Wilson's college career was interrupted in 1895 when the old Hawaiian monarchy was overthrown—and he immediately became involved in gun-running expeditions in an attempt to restore the monarchy, then finished his training and was graduated as a civil engineer.

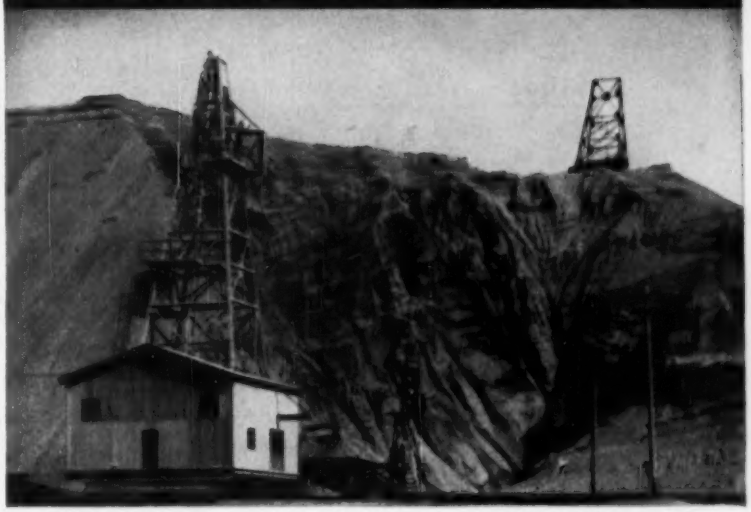
In 1902 he set up a contracting business in Honolulu—a company in which he was interested up to the time of his death—and simultaneously began a public service career that saw him at various times holding the posts of city engineer of Honolulu, mayor (1920-1931), director of the territorial department of public works, and mayor again (1947-1955). Proud of his polyglot ancestry "Johnny" Wilson was proudest of his last major works achievement—the ill-starred Koolau Mountain vehicular tunnel, now nearing completion after several construction accidents.

Henry W. Reybold, 74, former engineer with the Corps of Engineers, died June 16 in Wilmington, Del. Mr. Reybold, who retired in 1943 after 27 years' service with the Corps, worked on Delaware River construction and was in charge of building the first section of New Castle County Airport. He was a veteran of the Spanish American War and also served overseas as a lieutenant in the Engineer Corps during World War I.

William J. Kochring, 83, one of the three founders of the Kochring Co., Milwaukee manufacturers of construction equipment, died late in June at Milwaukee. Mr. Kochring was president of the firm until he moved up to the post of chairman of the board in 1940. He retired in 1952.

Marshall Lee Noel, 49, Ridgewood, N. J., president of Frantz Tractor Co., New York City, and executive vice president of the Maquinarias Bolivar A. C., a construction company at Puerto Ordaz, Venezuela, died June 20. Born in Ennis, Texas, Mr. Noel received an engineering degree at Texas A & M.

720 TONS . . . AN HOUR'S HAUL WITH THIS
SAUERMAN TOWER EXCAVATOR



Pioneer's giant excavator is the largest power scraper installation in the sand and gravel industry.

Pioneer Sand and Gravel Co., Seattle, Wash., needs a huge flow of material to supply its ready-mix plants and barges. They're getting it with a 12-cu. yd. Crescent Scraper.

The Crescent handles 480 yds. or 720 tons per hr. over an average haul from 300 to 350 ft. It operates along a 675-ft. span between movable head and tail towers located at the base and top of the 240-ft. high bank.

In addition to high rate of delivery, adoption of the Sauerman Method provides two other advantages over the 5-cu. yd. power shovel that formerly operated off the "toe" of the bank. These are: (1) material can now be taken from anywhere on the bank for blending and selection of gravel, and (2) material can be moved down the slope with no danger of cave-ins.

The tower excavator at Pioneer is mounted on portable towers and engineered by Sauerman for economical excavation in this type of deposit. This same digging tool . . . the Crescent scraper . . . can be engineered to your operation to give you equivalent high production at low cost.

Sauerman Scrapers range from ½ cu. yds. up to 18 cu. yds.

Because in most cases it is cheaper to drag material than it is to lift and transport it, *they give you the lowest cost per cu. yd. handled.*

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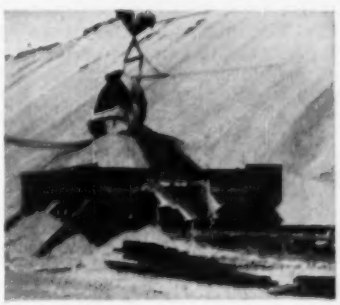
This view gives some conception of the height and steepness of the bank on which the Crescent works.



The Crescent delivers to a portable field hopper from which belt conveyors transport the material to the plant.

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Books

Storm-Water Inlets

THE DESIGN OF STORM-WATER INLETS—Compiled by the Storm Drainage Research Project Committee at Johns Hopkins University. 193 pp. The Johns Hopkins University, Baltimore, Md. $5.

This book summarizes the results of six years of research work on the design of storm-water inlets in a manner convenient for use in design offices. Included are 154 inlet rating curves and numerous rating tables, nomographs, charts of gutter flow parameters and empirical equations. A rapid graphical method for determining capacities of single and multiple inlets is presented.

Inlet types covered are curb, gutter, combination, deflector, sump and multiple inlets in depressed and undepressed settings and on various crown slopes and gutter grades.

The research work was financed jointly by the City of Baltimore, Baltimore County and the Maryland State Roads Commission and was conducted by the Department of Sanitary Engineering and Water Resources and the Department of Civil Engineering at Johns Hopkins University.

Guidebook for Construction

CONSTRUCTION PLANNING, EQUIPMENT, AND METHODS—By R. L. Peurifoy. 534 pp. McGraw-Hill Book Company, New York 36, N. Y. $8.50

This is a valuable guidebook for contractors, field engineers and others concerned with planning and development of construction projects. Design engineers will also find this text informative; its thorough insight into construction problems points out ways to avoid design requirements that increase construction costs without comensurate benefits.

The author believes that by careful engineering analyses a contractor will be able to establish more accurate control over the operation and cost of a job, both prior to bidding and during construction. Therefore, he suggests the use of efficient job layouts, cost control records, construction and equipment schedules. Sample diagrams and charts show in detail how such records can be effectively applied to particular jobs. This material is supplemented with a complete construction depreciation schedule and a chart showing hourly ownership operating costs of basic construction equipment.

A good part of the text is devoted to an analysis of specifications, ca-

pacity, output and uses of equipment. Tractors, power shovels, trenching machines, trucks, belt conveyor systems and pumps are discussed at length. Also included is information on physical properties of earth, which influence the selection and cost of equipment. Consideration is given to the advantages of owned vs. rented machinery and to the effect of job and management conditions on output. (There is even a time and motion study of a power shovel.)

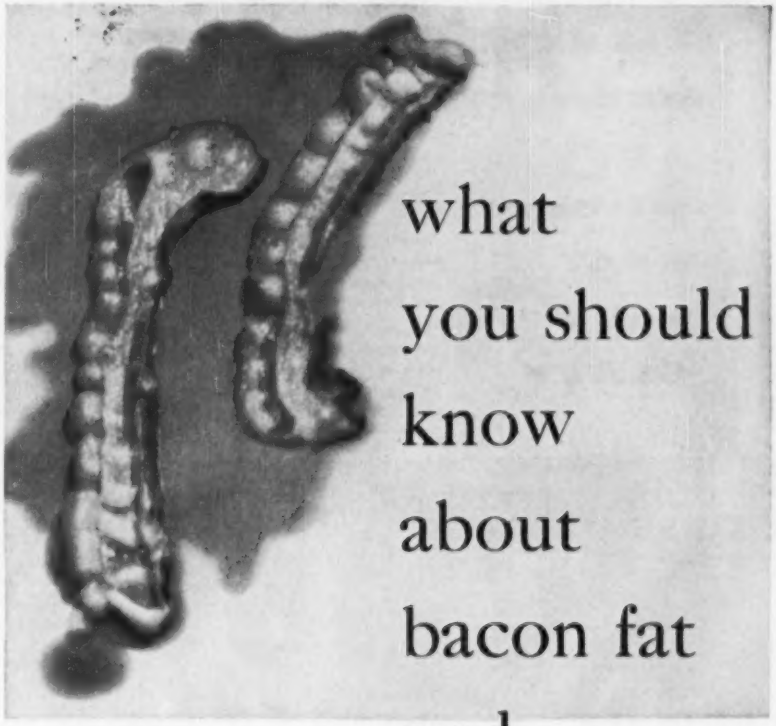
In successive chapters the author examines several methods of drilling and blasting rock, production of crushed stone aggregate, composition of piles, construction of cofferdams, foundation grouting, utilization of compressed air, production of concrete and erection of formwork. A final chapter explores the causes and the cost of field accidents and outlines a proposed safety program for the construction industry.

Illustrative tables, sample problems, charts and diagrams are generously supplied throughout the text.

Miscellaneous Notes . . .

• **The Building Research Advisory Board** has just sent to the Federal Housing Administration a 70-page Special Advisory Committee report that recommends structural analysis in determining the need for anchorage of exterior frame walls to various foundations. It states that if this is not done, anchorage should be required. The report contains a simplified method by which builders can determine whether or not anchorage is necessary. Included in the recommendations are anchorage requirements for wind, seismic forces and earth pressures. Effects of floods, tornadoes and blasts were omitted as either being disasters or requiring further research. Copies will be ready for distribution this summer at $1.50 each, from Building Research Institute, 2101 Constitution Avenue, Washington 25, D. C.

• **Results of Model Studies** by the Waterways Experiment Station of the Corps of Engineers are presented in a recently published Technical Memorandum, No. 2-337. The report is concerned with hydraulic and salinity verification of a model of the entire estuarine portion of the Delaware River, extending from the Capes to Trenton, N. J. Analysis of data indicates that the degree of accuracy in duplicating observed prototype con-



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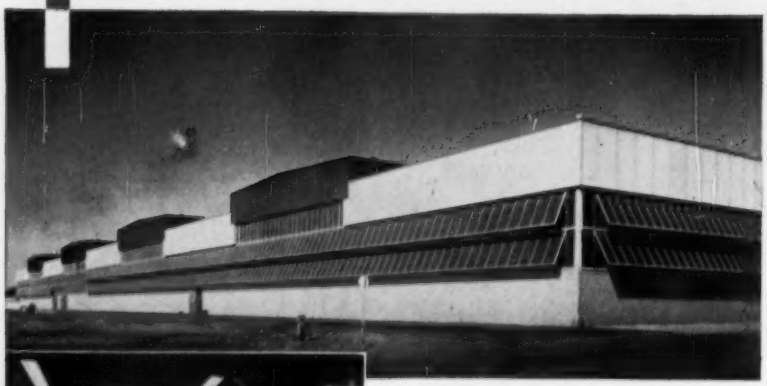

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ditions is excellent. Thus the model can be counted on as a source of reliable quantitative answers as to the effects of proposed modifications upon hydraulic and salinity characteristics of the estuary. The report may be obtained for $1.00 from the Waterways Experiment Station, Corps of Engineers, Vicksburg, Miss.

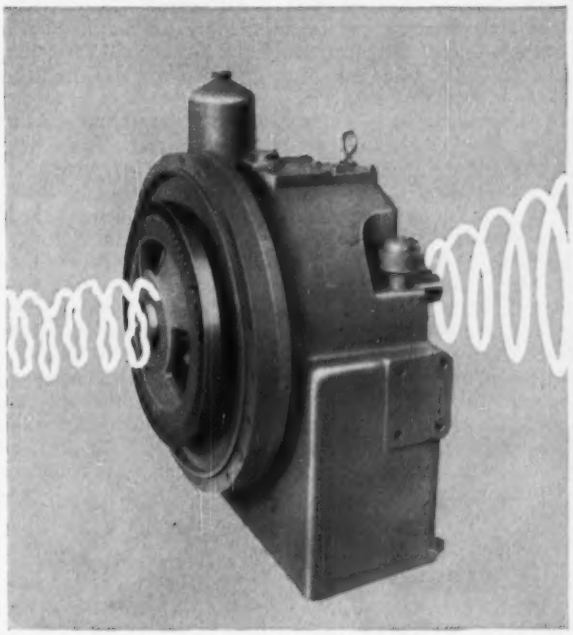
• **Mathematics of pile driving**—The determination of the stresses in a pile under the impact of a hammer is a most intricate mathematical problem, and one that has seldom been attacked with the thoroughness that is apparent in two recently published papers by Edward A. Smith, chief mechanical engineer, Raymond Concrete Pile Co. In "Impact and Longitudinal Wave Transmission", presented before ASCE, Smith derives necessary formulas and illustrates their use by examples. The other paper describes how the problem of impact was set up and solved on IBM electronic calculating machines. Both papers are available from the author at 140 Cedar St., New York 6, New York.

• **Termite and decay problems** in dwellings are evaluated in a 55-page report to the Federal Housing Administration by the Building Research Advisory Board. New information given includes a map showing the geographical distribution of termites, and a report on the effectiveness, life and toxicity of soil poisons. The chief content, however, is a review of existing data, including recommended protective measures. Entitled "Protection Against Decay and Termites in Residential Construction," the publication is available for $1.50 from the Building Research Institute, 2101 Constitution Ave., Washington 25, D. C.

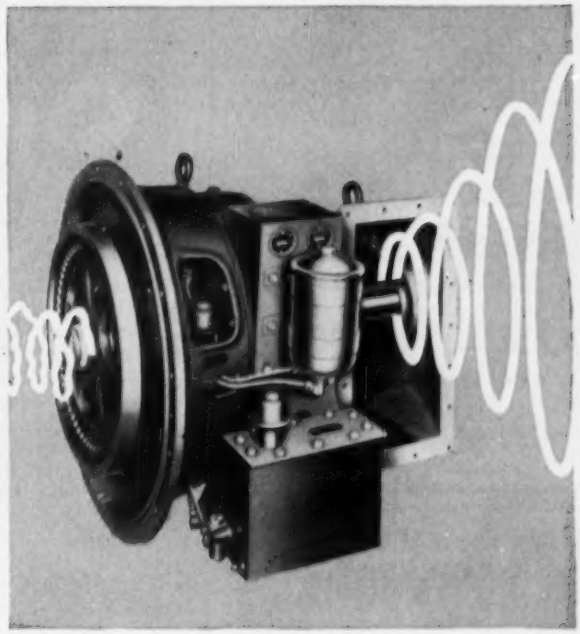
• **The Engineering Societies Directory,** which lists for all local, regional and national engineering societies a statement of their purposes and the names and addresses of their secretaries, has been prepared by Engineers Joint Council. It is available at a prepublication price of $3.50 from the EJC offices at 29 West 39th St., N.Y.C. 18.

• **Better criteria** for manufacturing and installing concrete face brick would minimize cracking, according to a Building Research Advisory Board report just out. Prepared by a Special Advisory Committee, the report is available at $1.50 from Building Research Institute, 2101 Constitution Ave., Washington 25, D. C.

Single-Stage or Three-Stage Torque Converters?



Single-Stage Torque Converter



Three-Stage Torque Converter

The answer to this question depends largely upon the characteristics of the equipment you manufacture *or* use and the jobs it is required to do. Naturally, many factors must be known before any engineering department can be expected to make recommendations.

Generally speaking, however, when it is desired to have minimum pulldown from governed engine speed—with maximum power output over a wide range—and to produce high torque ratios for hoisting or heavily loaded vehicles, a three-stage torque converter, with torque multiplication up to *six times,* may be most desirable. On the other hand, where mild torque conversion is required, as in certain types of vehicles and in other industrial equipment — a single-stage converter may be the best choice.

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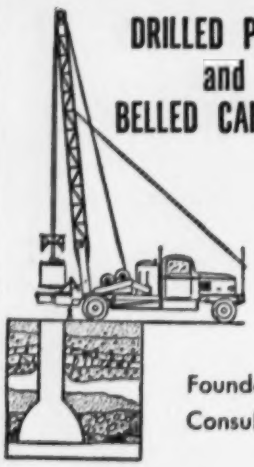

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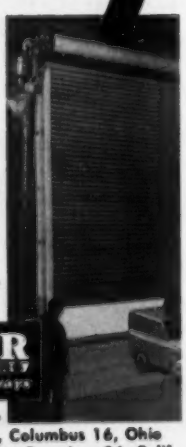

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Legal

Engineer's Decisions Held Final in Absence of Fraud

Contract provisions which empower the engineer to settle disputes growing out of a construction contract are generally accepted as valid. But there is still some doubt as to whether the engineer's decision should be considered as final and conclusive.

In a recent case in New Jersey,[1] where the contract provided that all disputes would be referred to the engineer and that his decision would be binding and conclusive, the court held that, in the absence of fraud, such determination was binding and conclusive. The contractor obtained a judgment at the trial despite the fact that his claim was not allowed by the engineer. The appellate court reversed the judgment and directed a new trial on the ground there was no evidence to show the determination of the engineer was fraudulent.

The contract in question involved construction of a sewage treatment plant. Elaborate information with respect to the nature of the work called for as well as the form of the contract to be entered into was made available to prospective bidders.

Included in the contract was a provision that the engineer "shall make all necessary explanations as to the meaning and intent of the specifications and drawings, shall give all orders and directions contemplated by the contract; . . . shall determine in all cases the amount, quality, acceptability and fitness of the several kinds of work and materials which are to be paid for; shall determine all questions in relation to said work and the construction thereof, and shall decide in all cases every question which may arise relative to the fulfillment of this contract on the part of the contractor. His estimate and decision shall be final and conclusive upon the contractor . . . and in case any question shall arise between the parties hereto touching this contract, such estimate and decision shall be a condition precedent to the right of the contractor to receive any money under this contract. . . ."

The contractor brought an action for breach of contract, claiming that the work had been completed and that there was a balance of $294,913.38 due under the contract which the Authority had refused to pay. It was claimed that the failure to make the payment was actuated by fraud on the part of the Authority and its engineer.

The complaint did not set forth any facts that constituted the alleged fraud. A claim was also made for $6,023.88 which the contractor claimed it was entitled to for extra work but which it said was illegally and fraudulently disapproved.

The Authority counterclaimed for damages resulting from defects in the work and for liquidated damages for delayed performance. This claim amounted to $45,973 which had been deducted from the amount that the Authority conceded was due the contractor.

At the trial, the jury brought in a verdict for the contractor. The appellate court reversed the judgment and directed a new trial, the appellate court holding that the evidence lacked proof to show that there was any fraud in the refusal on the part of the engineer to certify for payment the claims of the contractor.

The appellate court, referring to the contract provision that all disputes were to be decided by the engineer, stated: "Such a stipulation is a common one in modern construction contracts and decisions made thereunder by the person named have long since been regarded as dispositive of disputes between the parties, in the absence of clear proof of fraud upon the party of such person." "Fraud in this connection," it said, "has a broader connotation than is ordinarily implied. In addition to its ordinary significance, in construction contracts it includes arbitrary and gross mistakes. 9 Am. Jur., Building and Construction Contracts, Section 34, Restatement of Law, Contracts, Section 303.

"Where such ground is not established, failure to obtain the engineer's certificate or a favorable decision from him precludes a recovery. However, when fraud is proved, the legal significance thereof is that the necessity for favorable action of the engineer is eliminated as a condition precedent to the maintenance of the suit, but the contractor still has the burden of demonstrating the breach of the contract and his right of recovery."

As to the provision of the specifications authorizing the engineer to explain and interpret the specifications, the appellate court stated: "There appears to be a conflict among the authorities as to whether a provision in such contract giving authority to the engineer to construe language employed therein is legally valid and binding upon the parties in the event of a dispute. Some courts uphold the validity of the stipulation as well as the conclusiveness of the engineer's

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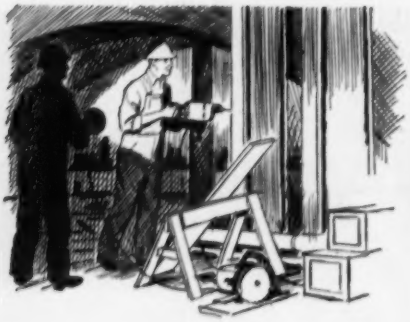

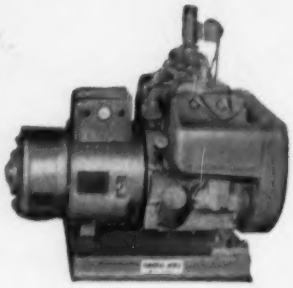

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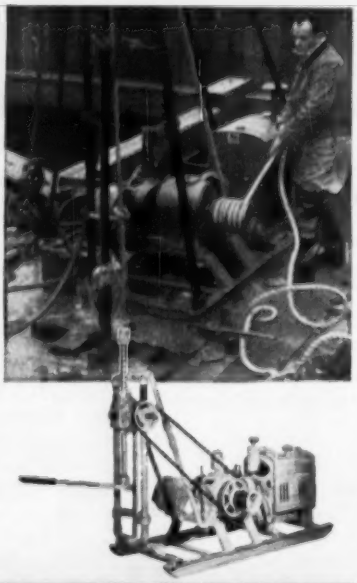

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interpretation of the contract. [Citing numerous authorities]. However, other jurisdictions regard the construction of a contract to be the traditional prerogative of the judiciary. Consequently, such provisions are condemned as an attempt to oust the courts of jurisdiction [citing cases]. But the later decisions seem to adopt a more liberal attitude, at least to the extent of recognizing the decision of the engineer as final where the dispute between the parties centers about the construction of ambiguous language in the contract. [Citing cases].

"While the precise problem has not been considered in New Jersey, so far as we have been able to discover, in our judgment the cause of justice would be served by the adoption of a rule which is somewhere between the two viewpoints.

"It is only necessary to recall the original and then changing attitude of the courts towards arbitration clauses in contracts to realize that the modern view is to permit competent parties bargaining at arms' length to make their own binding stipulations with regard to the subject matter of their negotiations, unless some strong public policy operates as a bar. Therefore it is our view that where such a contract confers that quasi-judicial authority on an engineer to make a binding construction of the language thereof in the absence of fraud or arbitrary action, his interpretation should be considered final in any case where the meaning of the language is ambiguous. [Citing cases]. This would seem consonant with the philosophy represented by our Arbitration Act, N.J.S., 2A:24-1 et seq., N.J.S. A., even though strictly speaking the engineer's action is not such an arbitration. However, where the language is clear and a dispute arises as to its significance, the engineer, even if acting in good faith, cannot construe it contrary to its unmistakable connotation or contrary to any fixed meaning that the language has in the law or in trade usage. See, State Highway Dept. of Georgia v. MacDonald Const. Co., 189 Ga. 490, 6 S.E. 2d 570, 137 A.L.R. 520, at page 528.

"Applying this principle here, we hold that in construing the language of the specifications, the engineer must act judicially and not arbitrarily. And if certain terms employed in the contract have a fixed and well known connotation in the trade, he is bound by that usage unless it is excluded or qualified by appropriate language. In such a situation he cannot make an interpretation at odds with the fixed meaning of the terms. If he does so,

his action would be non-judicial and classed as arbitrary even though made in good faith. See, Redlon Co. v. Franklin Square Corp., 89 N.H. 137, 195 A. 348, affirmed, 89 N.H. 137, 197 A. 329; Passaic Valley Sewerage Commissioners v. Tierney, 1 F.2d 304."

(1) Terminal Const. Corp. v. Bergen County Hackensack River Sanitary Sewer District Authority, 112 A. 2d 762, Superior Court of New Jersey, Appellate Division May 12, 1954

Modification of Contract Needs Some Consideration

Although some consideration must be exchanged to support a new agreement that modifies an existing contract, some courts will strain to find the necessary consideration.

In a federal case in Arkansas, for example, the United States had entered into a contract with Westmoreland Manganese Corporation under which the government was to advance to Westmoreland money needed to acquire land and to build a plant to produce manganese which would be bought by the government. The government was to get a mortgage on the property so acquired to secure the repayment of the money advanced to Westmoreland.

After the job was about 85% complete and the government had advanced the contractor over $3 million, the contractor made a demand on the government that it advance to it additional funds. The government agreed to do this and an amended agreement was entered into by the parties. This amended agreement gave the government the right to terminate the contract "at any time in the future up to the commencement of production upon determination by the Government that the termination of the Contract is to the best interest of the Government."

Some time after the modification of the agreement, the government's representatives, acting on the advice of its engineers, decided it was to the best interest of the government to terminate the contract and notified the contractor that it had elected to do so and demanded that it be given possession of the property.

The contractor refused to turn the property over to the government, whereupon the latter brought an action to foreclose its mortgage on the property and was granted a judgment.

The contractor claimed that the amended agreement, which gave the government the right to terminate the contract, was invalid for lack of consideration. As to this point, the court stated: "With regard to con-

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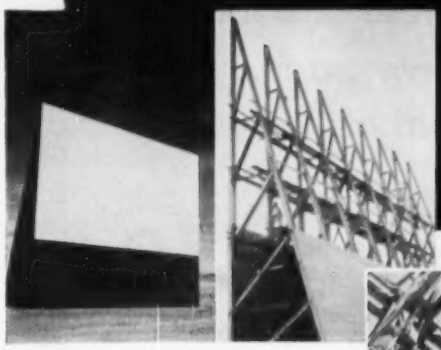

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ANOTHER
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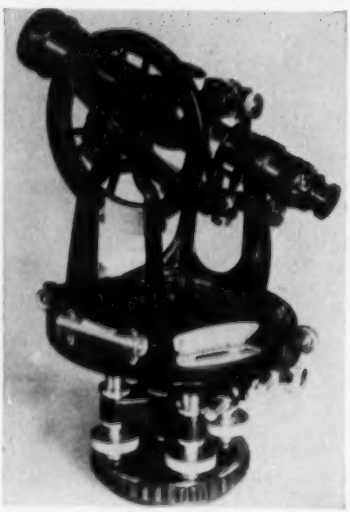

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sideration, the applicable principles of law are well settled and may be briefly stated: Parties who are capable of making a contract in the first instance are likewise capable of varying or modifying its terms, and their mutual agreements or undertakings in that connection furnish consideration for the modification; moreover, consideration for a contract may be found not only in benefits moving to the promisor (in this case Westmoreland), but also in legal detriment suffered by the promisee (here the Goevrnment) in reliance upon the agreement. Another principle of contract law, invoked by Westmoreland, is that ordinarily an undertaking by a party to do something that he is already obligated to do is not sufficient to constitute consideration; that general rule, however, is subject to an exception in cases where 'the very existence of the duty is the subject of honest and reasonable dispute.' 17 C. J. S., Contracts, Section 110."

The court found as a fact that the evidence produced at the trial was sufficient to show that the contractor derived some benefits from the amended agreement and that the government suffered some legal detriment and that under these circumstances the amended agreement was valid.[1]

(1) United States v. Westmoreland Manganese Corp., 134 F. Supp. 898, U. S. District Court of Arkansas, Sept. 23m 1955.

Courts Look Behind Scene For Meaning of a Contract

The meaning of a contract, or some of its terms, is often obscure. Since the parties theoretically gave it some meaning when they wrote it up, a court will use that as one of its guides in construing a contract.

Here are some of the general rules that have been evolved:

• "Where the parties to a contract have given it a practical construction by their conduct, such construction is entitled to great weight in determining its proper interpretation, especially where such practical construction occurred before any controversy arose."[1]

• "It is an elementary rule in the interpretation of contracts that whenever reasonably practicable every word shall be given effect. Rocci v. Massachusetts Accident Co., 222 Mass. 336,343, 110 N. E. 972,973."[2]

• "Where there is doubt as to the meaning of the terms of a contract, the construction given by the parties may be considered and adopted even though the contract is susceptible to another construction."[3] In this case, the court stated that in construing a

contract, "the whole of the same must be considered together so as to give effect to every part if reasonably practicable." Also, that the intent of the parties is to be gathered from a construction of the contract as a whole. "Courts, in construing a contract or a judgment of a court based upon a contract, may not rewrite the agreement or decree." . . . "The paramount object in construing contracts is to ascertain the intent of the parties at the time the contract was entered into and to give effect to their intention, if it can be done consistent with legal principles."

(1) United States v. Luther, 225 F. 2d 499.
(2) Hagerty v. Myers, 131 N.E. 176.
(3) Kelso v. Kelso, 225 F. 2d 918.

Contract Secured by Duress Is Not Void but Voidable

"It is a fundamental and well-settled rule that a contract obtained by duress is not ordinarily void, but merely voidable, and it may be subsequently ratified and confirmed. See, Abelman v. Indelli & Conforti Co., 170 App. Div. 740, 156 N. Y. S. 401. 'It is elementary that the claim of duress must, to be availed of, be asserted promptly or within a reasonable time after the alleged duress has ceased to exist.' Papert v. Conway, 107 N. Y. S. 2d 638, 640, affirmed 279 App. Div. 892, 111 N. Y. S. 2d 605."[1]

(1) Hudson River Yards Corp. v. Tillotson, 144 N.Y.S. 2d 183.

Prime Contractor, Surety Held Liable for Materials

A Maryland court has held both a general contractor and his surety liable for payment for materials furnished a subcontractor.[1]

The case was started by the Housing Authority of Baltimore on behalf of all persons who had furnished materials to a subcontractor.

Under the prime contract, the general contractor was required to provide and pay for all materials, services and facilities necessary to complete the work. This, said the court, gave the prime contractor the legal responsibility of seeing that all persons supplying material were paid.

The performance bond of the surety had a similar provision, with the result judgment was also against it.

(1) United States Fidelity & Guaranty Co. v. Housing Authority of Baltimore City, 111 A.2d 658, Court of Appeals of Maryland, Feb. 21, 1955.

(These summaries of court decisions are prepared by I. Vernon Werbin, New York attorney and civil engineer.)

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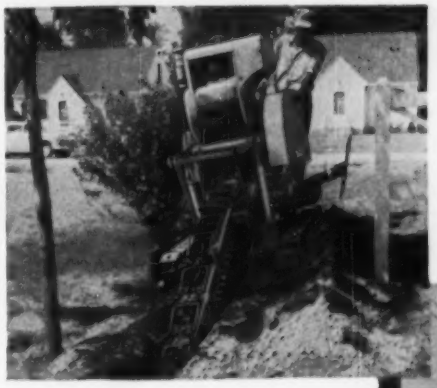

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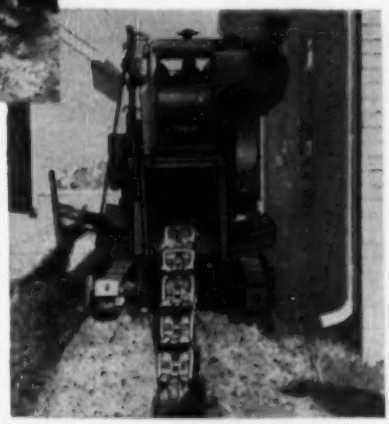
"We have used several makes of ditchers and find the Vermeer 4T POW-R-DITCHER superior for installations of small gas mains and services. We get more footage with less destruction to landscaping. Our experience in this type of work covers a 15 year period and a great variety of ground conditions."



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Portable, low-cost Kohler Electric Plants cut work time. Operate power tools, floodlights, wherever, whenever needed. Light-weight 2500 watt model has 4 receptables, pilot light. Engineered by Kohler throughout. Two-wheel, rubber-tired hand cart available. Other sizes, 500 watts to 35 KW. Write for folder H-23.

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Twenty years ago engineers built America's first scientifically-controlled soil-cement road in South Carolina. This low-cost road today carries much greater traffic yet requires only routine maintenance.

One of the newest soil-cement projects is the California highway at the left. In 20 years soil-cement paving has spread from coast to coast and proved itself under all climatic conditions. Today there are more than 10,000 miles of soil-cement roads delivering dependable, all-weather service.

This 20-year record of service has amply proved the value of soil-cement—the economical pavement made from local materials mixed with portland cement and water. About 85% of the required material usually is soil already on the site. Only cement and water must be hauled to the job.

For more information about soil-cement paving for low-cost roads, streets, and airports, write for free literature. It is distributed only in the United States and Canada.

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Unit Prices

Utah Compares Road Prices

Contracts for a plant-mix bituminous road at $10.287 per lin ft and for a road-mix job at $7.496 per lin ft cover eight miles of new highway for the State Road Commission of Utah in Salt Lake City.

The 3.5-in. plant-mix section of 5.265 miles went to L. A. Young Construction Company and Vernal Sand and Gravel Company, Richfield, Utah, for their low bid of $285,978. This is 11.6% below the second low bid and 2.55% below the engineer's estimate. J. Q. Adair of Mt. Pleasant, Utah, is consulting engineer.

The 2.5-in. road-mix section of 2.63 miles went to Wilkinson Construction Company, Morgan, Utah. Their successful bid was 16.75% below the engineer's estimate but only 0.9% under the second low bid. This job was designed by J. D. Hilton of Delta, Utah.

Specifications call for 6.3 bags cement per cu yd of class A concrete.

Wage rates are 2.50 for skilled labor, $1.975 for semi-skilled and $1.875 for common labor.

5.265 miles of 3.5-in. Plant-Mix Bituminous Surfaced Road in Sanpete County

1C L. A. Young Const. Co. & Vernal Sand & Gravel Co., Richfield, Utah $285,978
2 Strong Co., Springville, Utah 323,432
5 LeGrand Johnson Const. Co., Inc., Logan, Utah 356,743
EE J. Q. Adair, Mt. Pleasant, Utah 293,447

Bids: 5-15-56 Items	Unit	Quantity	Unit Prices 1C	2
Bit surf, plant mix, type B	t	14,100	$2.70	$3.25
type A	t	11,500	3.10	3.30
B t matl, 100-120 penetr	t	1,470	32.00	33.00
type MC-1 or MC-2	t	220	34.00	36.50
type RC-1 or RC-2	t	131	35.00	37.50
Grav surf, type B	t	27,000	0.90	0.90
base crse	t	42,000	0.80	0.80
Excav, roadway, unclassif.	cy	46,000	0.30	0.49
Borrow, imported	cy	79,000	0.21	0.29
Overhaul, cl A	stay	433,000	0.01	0.015
cl B	ydmi	25,000	0.12	0.15
Watering	Mgal	2,700	1.25	1.50
Roller tamping	hr	900	5.00	9.00
pneu tire or power	hr	170	6.00	9.00
CMP, 15"	lf	90	4.00	3.50
18"	lf	60	5.00	4.10
24", syphon	lf	1,972	5.00	6.10
30"	lf	208	8.00	7.60
36"	lf	510	12.00	12.00
CMP arches, 29x18"	lf	196	7.00	6.30
36x22"	lf	148	8.00	8.00
50x31"	lf	176	16.00	14.60
RCP, 18"	lf	30	10.00	5.00
24"	lf	114	10.00	9.00
Old road, obliterate	mi	0.10	200.00	500.00
Conc, cl A	cy	86	73.00	78.00
cl AA	cy	6	90.00	100.00
Steel, reinf	lb	6,250	0.18	0.17
struct	lb	250	1.00	0.40
Excav for struct, unclass.	cy	1,200	1.25	1.50
small ditch	cy	1,000	0.50	1.00
Tamp, mechanical	hr	150	5.00	6.00
Fences, ROW, type B	lf	21,000	0.26	0.37
type D	lf	3,000	0.30	0.39
Gates, 16'	ea	16	40.00	45.00
Markers, ROW	ea	80	10.00	8.00
Guide posts	ea	173	8.00	8.00
Guard rail	lf	504	4.00	4.00
Cross signs, rr	ea	2	125.00	400.00
Markers, FAP	ea	2	40.00	30.00
Water equip	f ls	job	1,500	2,000
Const signs	f ls	job	1,000	1,000
Cleanout, MH & man box, reconstruct.	ea	5	100.00	50.00

Time: 125 working days
Liquidated damages: $75.00 per day

2.63 Miles of 2.5-in. Road-Mix Bituminous Surface Road in Millard County

1C Wilkinson Const. Co., Morgan, Utah $104,099
2 L. A. Young Const. Co., & Vernal Sand & Gravel Co., Richfield, Utah 105,648
5 Thorn Const Co., Inc., Springville, Utah 136,455
EE J. D. Hilton, Delta, Utah 125,032

Bids 5-15-56 Items	Unit	Quantity	Unit Prices 1C	2
Bit matl, type MC-3	t	390	$32.96	$33.00
type MC-1 or MC-2	t	70	35.62	33.00
type RC-4	t	45	37.47	35.00
Bit additive	gal	105	2.00	3.00
Cover matl, type A	t	520	3.00	4.00
in stockpile	t	520	2.00	3.00
Grav surf, type B	t	17,700	0.82	0.95
Base crse, select matl	cy	28,100	0.80	0.70
Scarify & mix	mi	2,630	750.00	700.00
Excav, roadway, unclassif	cy	12,000	0.17	0.25
Borrow, imported	cy	13,500	0.33	0.25
Overhaul, cl A	stay	86,000	0.02	0.01
cl B	ydmi	13,500	0.20	0.15
Watering	Mgal	950	2.00	1.00
Roller, tamping	hr	200	9.00	6.00
pneu tire or power	hr	170	7.00	8.00
CMP, spec alk res, type A, 15"	lf	20	3.81	4.00
18"	lf	54	4.41	6.00
24"	lf	7	8.04	10.00
CMP arches, spec alk res, type A, 18x11"	lf	56	4.56	7.00
22x13"	lf	720	4.63	5.00
29x18"	lf	968	7.00	8.00
36x22"	lf	80	9.03	10.00
43x27"	lf	134	13.18	15.00
Conc, cl AA	cy	18	100.00	90.00
Steel, reinf	lb	1,350	0.15	0.20
Excav for struct, unclass	cy	900	1.40	1.00
small ditch	cy	4,500	0.50	0.50
Tamp, mechanical	hr	80	6.50	8.00
Guide posts	ea	30	7.00	10.00
ROW markers	ea	40	6.50	10.00
fence, type B	lf	27,900	0.35	0.30
Gates, 4'	ea	4	20.00	30.00
14'	ea	24	40.00	40.00
16'	ea	6	40.00	40.00
Markers, FAP	ea	2	30.00	40.00
Mail boxes, moving	ea	15	5.00	10.00
Clear & grubb	ls	job	1,000	3,600
Const signs	f ls	job	550.00	1,000
Water equip	f ls	job	250.00	1,000

Time to complete: 100 working days
Liquidated damages: $60.00 per day

Vermont Forest Road

Numerous large boulders and 8¾ acres of clearing and grubbing are the principal features of this 2-mile stretch of forest development road for U. S. Forest Service, Darby, Pa., H. M. Huckeley, engineer. It is 17 miles from Manchester Center, Vt.

The contract topped the engineer's estimate by 5.35%, but was 20.6% below the second low bid.

The owner furnishes asphalt coated corrugated metal pipe and pipe arch.

Minimum wage rates range from $3.45 for iron workers and $2.00 to $3.00 for equipment operators to $1.40 for truck drivers.

1C W. H. Morse Const. & Lumber Co., Inc., Bennington, Vt $29,280
2 Blue Mountain Const. Co., Grantham, N. H. 37,008
3 Edwin R. Putnam, Bridgewater Corners, Vt. 47,536
EE H. M. Huckeley, U. S. Forest Service 27,667

Bids: 6-5-56 Items	Unit	Quantity	Unit Prices 1C	2
Clear & grubb	ac	8.75	$700.00	$800.00
Excav, unclassified	cy	15,600	1.00	1.50
ACCMP, 15", 16 gage	lf	848	4.25	3.50
18", 16 gage	lf	282	5.00	4.00
24", 14 gage	lf	166	6.50	6.00
arches, 50x31"	lf	68	22.00	18.00
Riprap, loose	cy	18	10.00	15.00
Rock embkmt, hand-laid	cy	5	20.00	50.00

Time to complete: 130 calendar days
Liquidated damages: $25.00 per day

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Materials and Labor Prices — Monthly Market Quotations by ENR Field Reporters

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All Southern Pine is No. 2 common or better and for No. 1 N. C. Box. (Prices in Bold Face)
All Fir boards, dimensions, planks No. 2, Fir small timbers and timbers are No. 1. Lengths up to 20 ft. (Prices in italics)

	1x8 S4S	1x8 S4S	2x4 S4S	2x6 S4S	2x8 S4S	2x10 S4S	3x12 Rgh	6x12 Rgh	12x12 Rgh	LONG LEAF Y. P. Merchantable grade up to 20 ft. 2x12 Rgh	12x12 Rgh	PLYWOOD Rail freight increment (See note for base price) ⅜"	¾"
Atlanta †	$83.00	$85.00	$77.50	$76.00	$79.50	$79.50	$81.00	.....	.....			$22.32	$27.24
Baltimore *	93.00	96.00	96.00	100.00	100.00	104.00	114.00	.....	.....	$170.00	$185.00	25.92	31.60
	110.00g	*110.00g*	*108.00g*	*128.00g*	*128.00g*	*128.00g*	*155.00g*	*$144.00*	*$144.00*				
Birmingham †	86.00	86.00	81.00	86.00	91.00	96.00	111.00	.....	.....	115.00	160.00	21.78	26.58
	111.50	*111.50*	*114.50*	*115.00*	*115.00*	*116.50*	*114.50*	*111.50*	*111.50*	.....	.....		
Boston *	113.00a	115.00a	118.00a	118.00a	118.00a	117.00a	.....	.....	.....	.....	.....	25.92	31.60
	99.00a	*99.00a*	*118.00*	*118.00*	*118.00*	*124.00*	*129.00*	*140/148*	*148/155*				
Chicago **	101.00	104.00	97.00	112.00	120.00	121.00	116.00	.....	.....	144.00	144.00	22.45	27.37
	111.00	*111.00*	*108.00*	*128.00*	*128.00*	*128.00*	*131.00*	*131.00*	*131.00*				
Cincinnati *	101.25	102.50	90.00	96.25	103.00	111.50	119.50	.....	.....	141.75	141.75	25.00	30.48
	108.00	*108.00*	*111.50*	*118.25*	*114.75*	*116.00*	*128.00*	*128.00*	*128.00*	.....	.....		
Cleveland **	96.50	98.50	108.00	105.00	105.00	106.00	.....	.....	.....	.....	.....	25.37	30.93
	.....	.....	*122.00*	*118.00*	*118.00*	*118.00*	*156.00*	*156.00*	*156.00*	.....	.....		
Dallas ‡‡	75.00	82.00	75.00	75.00	72.00	72.00	130.00	.....	.....	130.00	140.00	18.72	22.80
Denver *	*Not in stock*		*180.00*	*181.00*	*181.00*	*128.00*	*155.00*	*155.00*	*164.00*	.....	.....	13.02	16.98
Detroit ‡	115.00	116.00	108.00	115.00	118.00	122.00	.....	.....	.....	130.00	.....	25.00	30.48
	125.00	*125.00*	*134.00*	*130.00*	*130.00*	*135.00*	*138.00*	*138.00*	*138.00*	.....	.....		
Kansas City *	130.00	130.00	125.00	130.00	140.00	140.00	.....	.....	.....	.....	.....	16.56	20.16
	130.00	*130.00*	*130.00*	*130.00*	*135.00*	*140.00*	*166.00*	*166.00*	*210.00*	.....	.....		
Los Angeles ‡	*108.00*	*108.00*	*108.00*	*108.00*	*108.00*	*108.00*	*135.00*	*135.00*	*135.00*	.....	.....	16.61ab	20.25ab
Minneapolis #	*140.00*	*140.00*	*145.00*	*145.00*	*145.00*	*145.00*	*185.00*	*185.00*	*185.00*	.....	.....	19.89	24.25
Montreal ab	100.00	110.00	100.00	100.00	110.00	130.00	.....	.....	.....	123.00	123.00	.....	.....
	130.00	*130.00*	*130.00*	*130.00*	*130.00*	*130.00*	*170.00*	*170.00*	*170.00*				
New Orleans †	106.00	106.00	98.00	91.00	96.00	100.00	124.00	.....	.....	156.00	154.00	18.72	22.80
	118.50	*118.50*	*118.50*	*118.50*	*118.50*	*125.50*	*156.00*	*156.00*	*156.00*				
New York *	120.00	122.00	125.00	130.00	130.00	130.00	175.00	.....	.....	260/280	260/280	25.92	31.60
	.....	.....	*137.50*	*137.50*	*137.50*	*139.50*	*175/190*	*175/185*	*175/185*				
Philadelphia ‡	.....	Range from $117.50 to $137.00				117/137	117/137	.....	.....	214/224	214/224	25.92	31.60
		Range from $181.00 to $165.00					*181/165*	*156/154*	*163.00*				
Pittsburgh †	103.00	107.00	94.00	105.00	110.00	110.00	165.00	.....	.....	145.00	.....	25.92	31.60
	120.00	*122.00*	*126.00*	*158.00*	*145.00*	*155.00*	*180.00*	*180.00*	*205.00*	.....	.....		
St. Louis #	117.00	119.00	127.00d	129.00d	129.00e	135.00e	.....	.....	.....	.....	.....	18.72	22.80
	.....	.....	*137.00*	*139.00e*	*139.00e*	*145.00e*	*195.00e*	*195.00*	*195.00*	.....	.....		
San Francisco A	*87.00*	*87.00*	*87.00*	*87.00*	*87.00*	*87.00*	*118.00*	*121.00*	*135.00*	.....	.....	12.22	14.91a
Seattle †	*68.00*	*74.00*	*78.00*	*78.00*	*78.00*	*80.00*	*95.00*	*105.00*	*108.00*	.....	.....	.....	.....
Toronto a	105.00	108.00	108.00	103.00	105.00	110.00	122.00	.....	.....	115.00	.....	.....	.....
	114.00	*119.00*	*135.00*	*130.00*	*130.00*	*140.00*	*151.00*	*145.00*	*150.00*	.....	.....	.....	.....

† F.o.b. mill. * F.o.b. city, CL, out of yard. ** F.o.b. city, CL, direct mill shipment. ‡ Deliv. to contr. CL. 1. Retail, LCL, at yard. # Retail, LCL, deliv. 2. Deliv. truck lots. 3. ass., truckload lots, $/6 Mfbm

LUMBER: Bold Face Type, Southern Pine. Italics, Douglas Fir. *a Spruce. *b Tax exempt. *c 5M lots. *d 8, 10, & 12 ft. lengths. *e 8 to 16 ft. lengths. *g No. 1 common. *j 8ft. lengths. *k No. 3 common. *n #3. A Incl rail rate from North west mills to San Francisco are $11.50 to $15.00 per M ft. bm. From Northern Calif. mills $9.00 by rail, $9.50 by truck. All rates for surfaced stock. For rough, add $3.00 to above figures.

PLYWOOD: Interior Fir Plywood, 4' by 8' panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface. Seattle base price on ¼", $162.00; on ¼", $182.00. Exterior ⅜", $180.00, ¼", $202.00. For other centers add rail freight increment from table on proper size. Oiling and edge sealing charges included. *a Lower rate by water shipment. *b 50,000 lb. minimum.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS Discounts from jobbers list, Feb. 1, 1950a Single or Double Strength A quality	B quality	EXPLOSIVES Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 200 lb. lots*	
Atlanta	78%c	78%c	$0.2465	
Baltimore	74%d	76%d	.2465	
Birmingham	82%	82%	.1915	
Boston	73-10%	72-10%	.2465	
Chicago	74%	74%	.2465	
Cincinnati	74%	74%	.2465	
Cleveland	74-2-10%	74-2-10%	.2865	
Dallas	78%	78%	.2540	
Denver	73%	73%	.2515	
Detroit	74-10-10%	74-10-10%	.2465	
Kansas City	78-10%	78-10%	.2515	
Los Angeles	70%	76%	.2490	
Minneapolis	73-10%	73-10%	.2515	
Montreal	40-10-5%bc	40-10-5%b	22.05b	
New Orleans	76%	78%	.2515	
New York	80%	80%	.4125g	
Philadelphia	74%	76%	.2465	
Pittsburgh	78%	78%	.2465	
St. Louis	76-10%	76-10%	.2515	
San Francisco	61%	66%	.2465	
Seattle	68%	71%	.2490	

Price of 60% Ammonia Gelatin is $0.15 per lb. higher than 40% in U. S., $1.75 per 100 lbs. higher in Canada.

Glass: *a Jobbers' list price per box, 14 x 20, ss, $42.75 for A quality, $37.50 for B quality; 14 x 20, ds, $60.00 for A quality, $52.75 for B quality. *b Discount from list, Apr. 1951; sales tax included, but 6% tax exemption not allowable for. *c 77% for single strength *d Discount 6/15/52. *e 77% for double strength

Explosives: * Cartridges of 1¼", 1½", 1¾", 2", 2¼", 2½", 3" diameters. Urban prices influenced by service charges or local storage and delivery regulations do not consistently reflect quantity prices in less congested areas. *g In borough of Kings, Queens, and Richmond and in Manhattan south of Canal St., add delivery charge of $20.00 per trip. *h F.o.b Beloeil (near Montreal), per 100 lb. forcite, 40%. Forcite 60%, $23.80

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla. and Me.	$0.1915	$0.2265	$0.2465
W. of Miss. to Rocky Mtn. States, Fla. and Maine	.1965	.2315	.2515
Rocky Mtn. States	.1965	.2315	.2515
Pacific N. W. States	.1940	.2290	.2490
Pacific S. W. States	.1915	.2265	.2465

PILES, TIES F. O. B.

PILES

Prices per linear foot, fir and pine, bark off, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail Pine*	By Rail Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.51	.....
12-in.—3-ft. from butt	6-in.	50 to 59-ft.	.54	.....
12-in.—3-ft. from butt	6-in.	60 to 69-ft.	.58	.....
12-in.—3-ft. from butt	6-in.	90 to 100-ft.	.....	.....
13-in.—3-ft. from butt	8-in.	91 to 100-ft.	.....	.....
14-in.—3-ft. from butt	6-in.	50 to 69-ft.	.50/.88	.....
14-in.—3-ft. from butt	6-in.	70 to 79-ft.	.78/.88	.93
14-in.—3-ft. from butt	8-in.	80 to 85-ft.	.83/.93	.94
14-in.—3-ft. from butt	8-in.	85 to 89-ft.	.....	1.00
14-in.—3-ft. from butt	8-in.	90 to 100-ft.	.....	1.09

* Pine piling over 80-ft. available only in limited quantities

RAILWAY TIES

Prices f.o.b. per tie for carload lots:

		6" x 8" x 8' Untr.	6" x 8" x 8' Tr.	7" x 8" x 8'6" Untr.	7" x 8" x 8'6" Tr.
Birmingham*	Hardwood, Grade 3	$1.70	$2.55	Gr. 5 $2.25	$3.33
	Grade 2	1.50	2.35	" 4 2.10	3.18
	Grade 1	1.15	2.00	" 3a 1.70	2.78
Chicago	Red Oak	.....	2.85a	.....	4.60a
New York	S. L. Sap Pine	2.00	4.00	3.00	5.00
	Mixed Oak	2.50	4.50	3.50	5.50
Philadelphia	Red Oak	2.95/3.15	4.50/4.70	3.60/3.80	5.50/5.75
St. Louis	White Oak	2.80		3.05	
	Red Oak	2.70	3.25a	2.90	3.55a
	Sap Pine or Cypress		3.15a		3.50a
San Francisco	Douglas Fir	2.13ef	3.09ef	2.88def	4.63cef

Tr.—Treated; Untr.—Untreated. a Creosoted. b 7" x 9" x 8'. c Empty cel c Green. f f.o.b. cars. * Add 75c/tie freight charge to Birmingham.

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works, per 100 lb.	$5.02
Chlorine cylinders, liquid, per lb. f.o.b. works	.103
Calcium chloride, 77-80%, flaked, 100-lb. paper bag, f.o.b. works, ton	29.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.	2.30
Soda ash, 58%, in paper bags, per 100 lb. dense	1.70
Sulphate of aluminum, commercial, in 100-lb. bags f.o.b. works	1.85
Sulphate of copper, in bags, 99% per 100 lb. f.o.b. works	14.90

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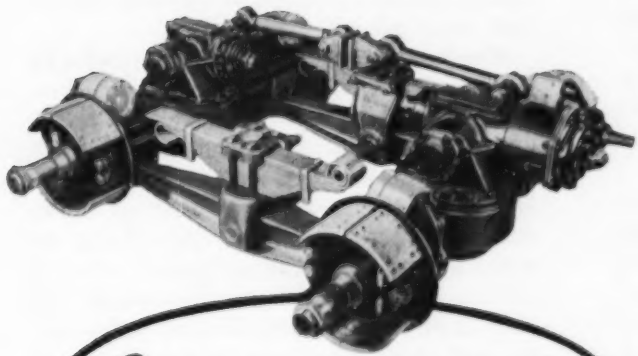

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12-G

THE SHORTAGE OF SCIENTISTS AND ENGINEERS:

A Threat to Economic Progress

THERE are two paramount reasons for concern over the serious shortage of scientists and engineers that now confronts the United States:

- The first reason, with which this editorial deals, is that continued expansion of our economy and further increases in our living standards are threatened unless we train more scientists and engineers and use them more effectively.
- The second reason for concern is that we run the risk of falling behind the Soviet Union in the technology so essential to national security. The consequences of losing this race to the Russians are not comforting. (The possibility that this might happen over the next few years was discussed in an earlier editorial in this series.)

The crucial contribution of scientists and engineers to the well-being of the American people has been to find ways of making better use of limited resources, to make equipment more productive, to develop new and better products that enrich our lives, to enable us to live longer and be healthier. They have made this contribution with greater success in the last 15 years than ever before, but it has required progressively more resources and more trained people.

During this 15-year period our annual production of goods and services, in dollars of constant purchasing power, has almost doubled. Since our total population has increased only 25 percent, this has meant a tremendous rise in the economic well-being of the American people as a whole. But in accomplishing this, the number of scientists and engineers has been more than doubled.

Tasks for Research

If the American economy is to continue to grow and if our living standards are to show further improvement, the work of scientists and engineers must be stepped up even more in the years ahead. Unless answers to several pressing problems are found through intensified research efforts, economic progress will become increasingly more difficult.

Productivity per hour of labor must be increased at a faster rate. Improved medical care has greatly increased the number of people who attain retirement age, and sharply higher birth rates since the war will mean larger numbers of children in school and college. Meantime, because of low birth rates during the depression, the number of people reaching working age is not rising nearly so fast. The result is that over the next 20 years our population will increase by about one-third, while the total manhours worked are not expected to increase more than 15 percent. So, simply to maintain the same living standards for a rising population — with no provision for additional improvements — ways must be found to enable each worker to produce for more dependents.

It is primarily to the scientists and engineers that we must look for help in making human labor more productive. This will require enormous increases in our power

resources. We will need to make more effective use of our existing fuel supplies — coal, oil and natural gas. And we will have to devise economically practical means of tapping other energy sources, particularly nuclear power and new rocket fuels.

Also, better ways must be found to use scarce and low-grade raw materials. Thanks to great strides in metallurgy and mining techniques, we are now utilizing sources of copper and iron ore that, for all practical purposes, were not available to us only ten years ago. Similar strides are needed in the mining and processing of bauxite if low-grade domestic ores are to help satisfy a fast-growing market for aluminum. And stubborn technical obstacles in the area of "high temperature" metals—such as nickel, cobalt, columbium, tantalum and titanium — are impeding progress in jet and turbine engines.

These are only a few of the challenging tasks that demand intensified research and engineering activity in the years immediately ahead if the United States is to continue to raise living standards. We need more houses, schools and highways for a rising population, more medical research to reduce further the ravages of illness, more research in chemistry and other sciences to sustain the flow of new and improved products that are so essential an ingredient of our economic progress.

Ceiling on Growth

American industry has indicated that it is ready to meet the challenge and undertake vastly expanded research programs. A recent survey conducted by the McGraw-Hill Department of Economics revealed that total research and development expenditures of American industry were almost $5 billion last year, 29% higher than in 1953. By 1959 business plans to be spending well over $6 billion on research and development. And the total could well prove to be much higher, based on the trend of recent years.

But industry's programs for research and development cannot be carried out unless enough qualified research workers and engineers are available. Ernest R. Breech, chairman of the Ford Motor Company, recently described the supply of engineers as the "ceiling on our future growth." He gave force to his point by announcing: "If 900 qualified engineers were to approach us next week looking for jobs, we would hire every one." The U. S. Bureau of Labor Statistics found in interviews with some 200 large companies at the end of 1954 — a recession year — that at least half were unable to hire enough research scientists and engineers to meet their needs. A third of the companies reported substantial shortages of technical personnel.

The shortage of technically trained people, furthermore, is becoming more acute. The number of engineers and scientists now being graduated is only about enough to cover replacement requirements, while the needs of industry, government and education are mounting every year. According to the best information available — as indicated in the first editorial in this series — these needs are now about twice as great as our current engineering graduating classes and annual production of scientists with Ph. D. degrees.

To perform the research needed to remove roadblocks to our economic progress — and at the same time hold our own in the technology essential to our security as a free nation — we must have an adequate supply of men and women with engineering and scientific training. Instead, we are faced with an acute shortage, now and for several years to come. Reasons for the shortage and proposals for working our way out of the shortage will be discussed in the remaining two editorials in this series.

This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

Bids Asked—Low Bidders—Contracts Awarded—First Section—

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J. A. MAHONEY, M. WETZEL, L. M. FELIX, F. S. DEMBEK, Reports.
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

BUILDINGS—BA

Mass., **Reading**—SCHOOL—BA 7/26—Town, c/o Supt. Schools, 63 Oakland Rd., elementary school, Forest St. $850,000. Plans deposit $60, refundable. Clinton F. Goodwin, 25 Washington Square, Haverhill, engr.-archt. CD 8/24.

▲ **Conn., Westport**—SCHOOL—BA 8/15—Town, School Bldg. Comn., Town School Office, Jessup Rd., 145,000 sq. ft. Senior High School, North Ave., $2,620,000. Plans deposit $75, refundable. Sherwood Mills & Smith, 65 Broad St., Stamford, archts. Marchant & Minges, 1007 Farmington Ave., West Hartford, struc. engrs. CD 6/2/55.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW HAMPSHIRE**—Dpt. P. Wks. & Hys., Concord, **Manchester Sand, Gravel & Cement Co., Inc.**, P. O. Box 536, Manchester, N. H. CA **$1,753,071**, b. conc. roadway 2.013 mi. and 3 steel beam bridges, F. E. Everett Turnpike, Manchester. Bids June 14. CD 6/20, under LB.

BUILDINGS—LB & CA

▲ **B. Perini & Sons, Inc.**, 73 Montvait Ave., Framingham, Mass. CA **$2,505,900**. Framingham HIGH SCHOOL, Flagg Dr., FRAMINGHAM, MASS. Town, Union Ave., Framingham, Mass. CD 6/20, under LB.

▲† **John A. Volpe Constr. Co., Inc.**, 54 Eastern Ave., Malden, Mass., CA **$1,524,347**. GENERAL LABORATORY (Science Res. Lab.), DA-19-016-ENG-4651, MIDDLETOWN, CONN. U. S. Eng., 150 Causeway St., Boston 15, Mass. CD 1/11/55.

MIDDLE ATLANTIC

BUILDINGS—BA

▲ **N. Y., Buffalo**—DORMITORY—BA 8/6—University of Buffalo, 3435 Main St., 11 story dormitory, $2,250,000, James, Meadows & Howard, 250 Delaware St., archts. CD 6/21.

BUILDINGS—SLC

▲ **N. J., Delair**—PLANT—Ford Motor Co., American Rd., Dearborn, Mich., soon lets contract 1 story, 763x483 ft., 366,766 sq. ft. masonry mfg. plant. $8,000,000. CD 5/14.

HEAVY CONSTRUCTION—LB & CA

Radory Constr. Corp., 94 Cherry Valley Rd., West Hempstead, N. Y. LB **$688,344**, storm water drain, Oswald Court and Allen St. area, OCEANSIDE, N. Y. Town Bd., Town of Hempstead, Front St., Hempstead, N. Y. Bids June 12.

▲ **Somers Constr. Co.**, 273 Montgomery Ave., Bala Cynwyd, Pa. LB **$1,132,430**, est. $1,298,925, 5 ammunition storage magazines, Dover Air Force Base, ENG-36-109-56-71, DOVER, N. J. U. S. Eng., 2635 Abbottsford Rd., Phila., Pa. Bids June 26. CD 6/8.

▲ **PENNSYLVANIA**—Pennsylvania Turnpike Comn., 11 N. Fourth St., Harrisburg,

Pa.—**New Enterprise Stone & Lime Co.**, New Enterprise, Pa. LB **$625,919**, resurf. 11.86 mi. Pa. Turnpike with bit. mixture from milepost 140.24 to milepost 152.0;

Pa.—**Stabler Constr. Co.**, 634 Lucknow Lane, Harrisburg, Pa. LB **$649,231**, resurf. 12.78 mi. of Pa. Turnpike with bit. mixture from Rays Hill Tunnel westward;

Pa.—**Allegheny Contg. Industries**, 801 Gingham St., Pittsburgh, Pa. LB **$888,545**, resurf. 15.01 mi. of Pa. Turnpike from Irwin Interchange eastward (Contr. 183);

Pa.—**Allied Asphalt Co.**, P. O. Box 10, 838, Pittsburgh 36, Pa. LB **$131,665**, undersealing 9.2 mi. concrete roadway with bit. material between milepost 177.0 and 186.2, Pa. Turnpike, 191;

Pa.—**McIntosh Road Materials Co.**, R. D. 2, Harrisburg, Pa. LB **$233,944**, undersealing 16 mi. concrete road with bit. material between mileposts 210.0 and 226.0, Pa. Turnpike, 192. Bids July 3. CD 6/25 and 6/21.

▲ **Conduit & Foundation Corp.**, 158 N. 20 St., Phila., Pa. CA **$1,410,544**, bridge Henry Ave. over Green Lane and over Gorgas Lane, Bid 3775, PHILA., Pa. City, Dpt. Procurement, City Hall Annex, Phila., Pa. CD 6/8, under LB.

Donaldson Paving Co., 20 Potomac Ave. S.W., Wash., D. C., CA **$663,495**, repairing asphaltic pavements and concrete bases, various locations, WASH., D. C. D. C. Govt., Dpt. Hys., 499 Pa. Ave. N.W., Wash., D. C. Bids June 15, awarded June 26. CD 6/25, under LB.

BUILDINGS—LB & CA

▲ **Westwood Manor Homes**, c/o Nassau-Suffolk Realty Co., Broadway, Massapequa, N. Y. Owner Builds. $4,500,000. 350 HOUSES on tract on Washington Ave., BRENTWOOD, N. Y.

▲ **Robin Hood Park**, c/o Alwin Cassens Jr., archt., 145 S. Franklin Rd., Valley Stream, N. Y. Owner Builds. $1,500,000. 100 HOUSES, on 35 acre tract, FARMINGDALE, N. Y.

F. T. Williams Co., 325 Grote St., Buffalo, N. Y. CA **$673,703**. ELEMENTARY SCHOOL, GRAND ISLAND, N. Y. Grand Island Central School, Grand Island, N. Y. CD 5/7.

▲ **John W. Cowper Co., Inc.**, 775 Main St., Buffalo, N. Y. LB **$1,652,300**. 4 story, 115x279 ft., brick, masonry, stone MECHANICAL ENGINEERING BLDG., ITHACA, N. Y. Cornell University, Ithaca, N. Y. Bids June 20. CD 6/5.

▲ **Lewis C. Bowers & Son, Inc.**, 1851 E. State St., Princeton, N. J. CA **$1,000,000**. 1 story, masonry, 11,400 sq. ft. MANUFACTURING and OFFICE, BARRINGTON, N. J. National Metal Edge Box Co., 12 and Callowhill Sts., Phila., Pa. Fulmer & Bowers, 341 Nassau St., Princeton, N. J., archts.

▲ **Paramount Shopping Centers, Inc.**, c/o C. B. Snyder, Realty, 61 Newark St., Hoboken, N. J. CA Est. $3,250,000. SHOPPING CENTER, on Hy. 46 and Van Houten Ave., CLIFTON, N. J. Paramount Shopping Center, Inc., c/o Samuel Hirsch & C. B. Snyder Realty Co., 41 E. 42 St., New York, N. Y. Peter H. Holley, 195 Van Houten St., Paterson, N. J., archt.

▲ **Pine Brook Homes, Inc.**, c/o Elzer Drowell, Whitall Ave., Millville, N. J. Separate Contracts. $3,000,000. RESIDENTIAL DEVELOPMENT, 290 units, Whitall Ave., MILLVILLE, N. J. Dante J. D'Anastaio, 1815 Federal St., Camden, N. J., archt.

▲ **A & S Sommer Constr. Co.**, Rte. 9, Iselin, N. J. CA Est. $3,000,000. SHOPPING CENTER, NORTH PLAINFIELD, N. J. Reamon Realty Co., Rte. 9 and Green St., Iselin and A & S Sommer, Rte. 9, Iselin, N. J.

▲ **Oscar Lowrie**, 6 Court St., Morristown, N. J. CA Est. $9,000,000. 650 HOMES on 400 acre tract in Rockaway Twp., ROCKAWAY, N. J. Morris Manor Homes, Inc., Oscar Lawrie, 6 Court St., Morristown, N. J.

▲ **Del Haven-Villas Constr. Co.**, Villas, N. J. Separate Contracts. $1,080,000. RESIDENTIAL DEVELOPMENT, 180 units, VILLAS, N. J.

▲ **Martin Field**, 1701 Delaware Rd., Phila., Pa. Separate Contracts. $2,000,000. RESIDENTIAL DEVELOPMENT, Cuthbert Rd., WESTMONT, N. J. Lester H. Weckesser, Erlton, N. J., archt.

▲ **Strafford Builders, Inc.**, 517 W. Lancaster Ave., Wayne, Pa. Separate Contracts. $3,750,000. RESIDENTIAL DEVELOPMENT, 250 units, DOWINGTOWN, PA.

▲ **Ritter Bros.**, 1511 N. Cameron St., Harrisburg, Pa. CA $1,082,098. 1 and 2 story, brick, county NURSING HOME, HARRISBURG, PA. Comrs., Dauphin Co. Court House, Harrisburg, Pa. CD 6/12, under LB.

▲ **A. P. Orleans & Co.**, 100 W. Rockland St., Phila., Pa. Separate Contracts. $2,500,000. 1 and 2 story, 250,000 sq. ft. brick SHOPPING CENTER, Cottman St. and Bustleton Ave., PHILA., PA. Aaron Colish, 117 S 17 St., Phila., Pa., archt. Dorfman & Bloom, 1411 Walnut St., Phila., Pa., engrs. CD 8/28/51.

▲ **Sordoni Constr. Co.**, Forty Fort, Pa. CA Est. $4,000,000. mineral fiber acoustical tile PLANT near PITTSTON, PA. The Celotex Corp., Otis S. Mansell, pres., 120 S. LaSalle St., Chicago 3, Ill. Bids Mar. 21. CD 3/22.

▲ **United Engineering & Foundry Co.**, 948 Fort Duquesne Blvd., Pittsburgh, Pa. CA Est. $13,500,000. 44x104 in blooming and slabbing MILL, SHARON, PA. Sharon Steel Corp., Sharon, Pa.

W. P. Lipscomb Co. Inc., Washington Bldg., Wash. D. C. CA **$700,000**. HOME FOR AGED, 3122-24 Q St. N. W. WASH. D. C. Episcopal Church Home, 3715 Wisconsin Ave. N. W. Wash. D. C. Bids May 16, awarded July 5. CD 5/29 under LB.

▲ **Robino Homes, Inc.**, Milltown Rd., Sherbrook, Wilmington, Del. Separate Contracts. $2,500,000. RESIDENTIAL DEVELOPMENT, 250 units, St. James Church Rd., WILMINGTON, DEL.

SOUTH

BUILDINGS—BA

Fla., Deland—STUDENT UNION—BA 7/27—Stetson University, Deland, student union bldg., Stetson University. $800,000. Plans deposit $50. James Gamble Rogers II, 145 Lincoln Ave., Winter Park, archt. CD 2/8.

▲ **Va., Fort Belvoir**—HOUSING—BA On Or About 8/14—U. S. Eng., 1st and Douglas Sts. N.W., Wash. 25, D. C. construct and finance 618 housing units, Capehart Housing, ENG-49-080-57-3-(3). Plans deposit $25. CD 3/29.

HEAVY CONSTRUCTION—LB & CA

▲† **Wise Contr Co., Inc.**, 8 and Grace Sts., Richmond, Va., CA $1,332,884. Air National Guard Facilities, hangar, 4 service bldgs., fuel storage and dispersing sys., Byrd Field, ENG-44-110-56-33. RICHMOND, VA. U. S. Eng., foot of Front St., Norfolk 1, Va. Bids June 22. CD 6/29, under LB.

▲† **McCullough Dredging Co.**, 300 S. 41 St., Birmingham, Ala. CA **$1,025,450**. dredge channel in Apalachicola River from Gulf Intracoastal Waterway to Jim Woodruff Dam in northwest Florida, FLORIDA. U. S. Eng., P. O. Box 1169, Mobile 7, Ala. Awarded June 25. CD 9/19/55.

† **T. E. Akers & Co.**, 1213 Division St., Nashville, Tenn., CA $999,000, maintenance hangar exten. Sewart Air Force Base, ENG-40-058-56-35, SMYRNA, TENN. U. S. Eng., 306 Federal Office Bldg., Nashville 1, Tenn. Bids June 13. CD 5/9.

BUILDINGS—LB & CA

▲† **Wise Contrg. Co.**, 8th and Grace Sts., Richmond, Va., LB $5,121,890, (3 bidders) eight 3 story concrete BARRACKS, ENG-44-110-56-35, FORT LEE, VA. U. S. Eng., foot of Front St., Norfolk 1, Va. Bids June 26. Low bidder withdrew bid. CD 6/29, under LB.

† **Wise Contrg Co., Inc.**, 8th and Grace Sts., Richmond, Va., CA **$783,656**, REGIMENTAL MOTOR PARK, BRANCH POST EXCHANGE, two BATTALION HEADQUARTERS. ENG-44-110-56-30, FORT LEE, VA. U. S. Eng., foot of Front St., Norfolk 1, Va. Bids June 14. CD 6/20, under LB.

▲ **Poplar-Halls-By-Larrymore Homes**, c/o Herman York, archt., 90-04 161 St., Jamaica, N. Y. Owner Builds. $8,000,000. 600 HOUSES, SHOPPING CENTER, 240-acre tract, Virginia Beach Blvd. and Military Hy., NORFOLK, VA.

† **Irons & Reynolds**, 1724 H St. N.W., Wash. D. C., CA $876,772 (4 bidders) MEDICAL FACILITIES, incl. approx. 35,000 sq. ft. dispensary, 2 floors; approx. 23x54 ft. ambulance shelter; 12x12 ft. storage shed, Marine Corps Schools, NOy 91993, QUANTICO, VA. Dist. P. Wks. Office, Potomac River Naval Command, Naval Gun Factory, Wash. D. C. Bids June 21. CD 6/28, under LB.

Coltrane-Graham Constr. Co., 245 S. Hamilton St., High Point, N. C., CA **$821,733**. HOSPITAL addns., alterations HIGH POINT, N. C. High Point Memorial Hospital, High Point, N. C. Bids June 20. CD 6/29, under LB.

(Continued on page 96)

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England	**Middle West**
Middle Atlantic	**West of Mississippi**
South	**Far West**

PROPOSED WORK

Water Supply	**Public Buildings**
Sewers, Waste Disposal	**Mass Housing**
Bridges	**Commercial Buildings**
Streets & Roads	**Industrial Buildings**
Earthwork, Waterways	**Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.

SOON LETS CONTRACT: SLC

LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see Construction Daily.

New Chemical Center Specifies CLAY PIPE for Sewerage System

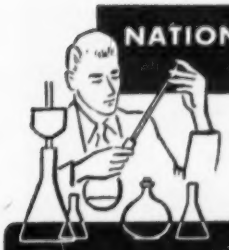
CALVERT CITY, KY. recently installed 87,000 feet of Vitrified Clay Pipe as the initial project in the town's fast-growing sewerage system. In recent years, Calvert City has put itself on the industrial map by attracting a group of large chemical industries and establishing a new major chemical center. So far, $30 million has been invested in plants, with $9 million more committed for construction. Population has jumped from 400 to 1,000, and is expected to hit 10,000 within the next 10 years. When the need for a modern sewerage system became apparent, city officials realized that they had an opportunity to "do the job right" from the very beginning. Wisely, they specified Vitrified Clay Pipe.

Clay Pipe is *permanently* safe against chemical action. Time can't weaken it . . . countless years of service can't wear it out. Each section is *guaranteed for 50 years*—barrel, bell, and spigot. And that's your assurance that Clay Pipe sewers will be giving trouble-free service long after the financing bond issue is retired. It pays to specify Vitrified Clay Pipe—the *only* pipe that *never wears out.*

CITY OFFICIALS:
H. V. Duckett, *Mayor*
Municipal Water and Sewer Commission:
Myron S. Pfeifer, T. W. Heilala, J. B. McLemore

CONSULTING ENGINEER:
Maurice L. Miller; H. D. Keesling, *Field Engineer*

CONTRACTOR:
Charles Boyd & Son; Joseph W. Boyd, *Supt.*



NATIONAL CLAY PIPE MANUFACTURERS, INC.
1820 N. Street, N.W., Washington 6, D. C.

206 Connally Bldg., Atlanta 3, Ga.
100 N. LaSalle St., Rm. 2100, Chicago 2, Ill.
703 Ninth & Hill Bldg., Los Angeles 15, Calif.
311 High Long Bldg., 5 E. Long St., Columbus 15, Ohio

Vitrified CLAY PIPE

C-116-4

Progress in Public Health - Through Clay Pipe Research

(Continued from page 94)

▲ **Centex Constr. Co. Inc.**, 4606 Greenville Ave., Dallas 6, Tex., CA **$6,353,865**. construct and finance, armed services HOUSING, 500-units, IFB 08-603-56-562, EGLIN AIR FORCE BASE, FLA. Base Procurement Office, Eglin Air Force Base, Fla. Bids May 29, awarded July 5. CD 6/5, under LB.

† **Whaley Co., Inc.**, 6424 1st Ave. N., Birmingham, Ala., CA **$616,197**, three STATIC TEST SERVICE BLDGS. Redstone Arsenal, HUNTSVILLE, ALA. U. S. Eng., Mobile, Ala. Bids June 29, awarded July 3.

† **V. L. Nicholson Co.**, 611 S. Central St., Knoxville, Tenn., LB **$660,240**. BIOLOGY expansion, Bldg. 9207 and expansion of Mouse Genetics Facility, Bldg. 9210, Y-12 area, Inv. 401-56-9A, OAK RIDGE, TENN. Atomic Energy Comn., Oak Ridge, Tenn. Bids June 26.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

O., **Willoughby**—BA 7/30—City, City Hall, Contr. A, sewage plant, Willoughby-Eastlake Sewage Disposal System, $933,000. Plans deposit $50. Havens & Emerson, 640 Leader Bldg., Cleveland, Zone 14, engrs. CD 11/9.

BUILDINGS—BA

Mich., **Roseville**—SCHOOL—BA 7/24—Bd. Educ., Roseville School Dist., 18115 11 Mile Rd., Junior High School, $700,000. Plans deposit $25, refundable. Wyeth & Harman, Inc., 1602 Military St., Port Huron, archt.

O., **Cincinnati**—OFFICE, etc.—BA 7/26—Good Will Industries, 518 E. Pearl St., 200x500 ft. office, research bldg., east side, Springfield Pike. $700,000. Plans deposit $50. Sullivan-Isaacs-Sullivan & Assoc., 1800 Reading Rd., Reading, engrs.-archts. CD 11/21.

Mich., **Adrian**—SCHOOL—BA 7/31—City, Bd. Educ., James I. Moran, secy., 2 story Junior High School. addn. to existing Senior High School, $793,000. Louis C. Kingscott & Assoc., Inc., 511 Monroe St., Kalamazoo, archt. CD 6/22.

HEAVY CONSTRUCTION—LB & CA

▲ **National Engineering & Contg. Co.**, 1968 W. 3 St., Cleveland, O., LB **$897,370** (9 bidders) Contr. A, general constr. filter bldg. addn. and high lift pumping station, mixing basins, sedimentation basins, generating room; six 1½ m.g.d. filters, water storage basin, etc., SANDUSKY, O. City, City Hall, Sandusky, O. Jones, Henry & Williams, Security Bldg., Toledo, O., engrs. Bids June 20. CD 12/24/52: **Pitt Constr. Co., Inc.**, 1235 Washington Blvd., Pittsburgh, Pa., LB **$305,570** (13 bidders) Contr. B, piping and filter equip. for WW addn. (Sandusky, O.);

Funk Constr. Co., New London, O., LB **$63,800** (2 bidders) Contr. F, install 280 ft. 24 in. and 1,100 ft. 30 in. pipe line, (Sandusky, O.).

▲ **Thos. McQueen Co.**, 1313 Circle Dr., Forest Park, Ill., LB **$2,331,389**. Calumet Skyway Toll bridge Contr. 5A, structures complete Colfax Ave. to Exchange Pl., CHICAGO, ILL. City, City Hall, Chicago, Ill. DeLeuw Cather & Co., 150 N. LaSalle St., Chicago, Ill., project engrs. A. J. Boynton & Co., 111 N. Wabash St., Chicago, Ill., engr. Bids June 18. CD 6/5.

BUILDINGS—LB & CA

▲ **Hunkin-Conkey Constr. Co.**, 1740 E. 12 St., Cleveland 14, O., CA Est. **$425,000**. 105x360 ft. SHIPPING BLDG. addn., 3430 Campbell Rd.; CA **$475,000**, 46x269 ft. MOTOR ROOM addn. and 85x295 ft. BLOOMING MILL addn., 3175 Independence Rd.; CA **$600,000**, 101x599 ft. SLAB YARD BLDG., 3175 Independence Rd., CLEVELAND, O. Grand total $1,500,000. Republic Steel Corp., Republic Bldg., Cleveland, Zone 15, O. CD 5/31.

▲ **Fred W. Entenman, Inc.**, Secor Rd., Toledo, O. CA Est. **$1,500,000**. 12-store SHOPPING CENTER, Monroe St. and Detroit Ave., 600-car parking. TOLEDO, O. Kroger Co., 1240 State St., Cincinnati, O. CD 10/12.

▲ **Avery Quality, Inc.**, c/o Wyandott Development Co., Inc., 2344 Ridgewood St., Youngstown, O. Owner Builds. **$3,000,000**. 228 HOMES, S. Buckeye Circle-Ridgewood Rd. area, YOUNGSTOWN, O.

▲ **United Engineering & Foundry Co.**, 948 Fort Duquesne Blvd., Pittsburgh, Pa. CA Total est. **$200,000,000**. SLABBING MILL producing 1,800,000 tons annually increasing production annually to 6,000,00 tons, EAST CHICAGO, IND. Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill. Awarded July 6. CD 11/11.

▲ **Koppers Engineering & Construction Div.**, Koppers Bldg., Pittsburgh 19, Pa. CA Total Est. **$10,000,000**. design and construct AMMONIA ABSORBER to treat 38,000,000 cu. ft. coke gas per day, producing 32 tons ammonium sulphate, pumps, pipe and instruments, CHICAGO, ILL. Wisconsin Steel Works, Div. International Harvester Co., Torrance and 106 Sts., Chicago, Ill. CD 2/29.

▲ **Koening Eng. Corp.**, 4400 W. Mitchell St., Milwaukee, Wis., CA **$1,882,332**, general constr. West Division HIGH SCHOOL, MILWAUKEE, WIS. Bd. School Directors, 1111 N. 10 St., Milwaukee, Wis. Bids June 14, awarded June 30. CD 6/21, under LB.

Magaw Electric Co., 728 N. Jefferson St., Milwaukee, Wis., CA **$407,400**, electrical work (Milwaukee, Wis.).

▲ **Turner Constr. Co.**, 105 W. Adams St., Chicago, Ill. CA Est. **$4,000,000**. FIBERBOARD PLANT, L'ANSE, MICH. The Celotex Corp., Otis S. Mansell, pres., 120 S. LaSalle St., Chicago 3, Ill. Giffels & Vallet, 1000 Marquette Bldg., Detroit, Mich., engrs.-archts.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

† **Kansas**—BA 8/8—U. S. Eng., Box 61, Tulsa 2, Okla., floodway structures, Chisholm Creek Diversion, Wichita, CIVENG-34-066-57-1, $750,000.

BUILDINGS—BA

Mo., **Joplin**—HOSPITAL—BA 7/26—Freeman Hospital, Paul F. Detrick, admin., Joplin, 4 story, hospital addn., remodeling existing structure. $713,500. Hewitt & Royer, 707 Westport Rd., Kansas City, Mo., archts. CD 9/8.

▲ **Tex., Baytown**—REFINERY UNIT—Bids Asked—Humble Oil & Refining Co., 1210 Main St., Houston, catalytic cracking refinery unit. Total est. $27,000,000.

BUILDINGS—SLC

▲ **Tex., Fort Worth** — DORMITORY — Texas Christian University, Dr. M. E. Sadler, pres., TCU Campus, soon lets contract 3 story, brick, tile, concrete men's dormitory, air-conditioned $1,125,000. Joseph R. Pelich, 1203 Commercial Std. Bldg., archt. CD 4/23.

HEAVY CONSTRUCTION—LB & CA

Orfei & Mariani, 1156 Homer St., St. Paul, Minn. LB **$853,000**. (4 bidders) furnish, install lateral sewers, Projs. L to O (inclusive), CRYSTAL, MINN. Village, K. Evans, clk., Crystal, Minn. Bids June 22. CD 6/7.

† **Bushman Constr. Co.**, 5 and Felix Sts., St. Joseph, Mo., CA **$755,598**. earthwork and structures for Upper Meeker Canal, Station 567 plus 00 to 812 plus 17 and drains; Upper Meeker Subcanal, Station 0. plus 00 to 417 plus 70 and drains; lateral sys. for Upper Meeker Canal and Subcanal, Frenchman-Cambridge Div., Schedules 1 and 2, Missouri River Basin Proj., Spec. DC 4695, NEBRASKA. Bureau Reclamation, Dpt. Interior, McCook, Neb. Bids June 22. CD 6/29, under LB.

BUILDINGS—LB & CA

▲ **Rosendahl Corp.**, 100 Bush St., San Francisco, Calif. CA Est. **$6,000,000**. GYPSUM BOARD PLANT and PLASTER BOARD MILL, FORT DODGE, IOWA. The Celotex Corp., Otis S. Mansell, pres., 120 S. LaSalle St., Chicago 3, Ill. Johnson & Johnson Engineers-Architects, Inc., 111 W. Washington St., Chicago, Ill., archt.-engr. CD 5/24.

▲ **Lummus Co.**, 385 Madison Ave., New York 17, N. Y. CA Est. **$6,000,000**. 6,200 bbl. per day ultraforming unit at REFINERY, EL DORADO, ARK.

ROCKFORD

This is the Clutch that the nations largest manufacturers of heavy-duty machines are showing as a NEW feature

*TRADE MARK

"MORLIFE clutch has gone 851 hours without slipping or adjustment."

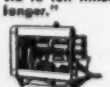
"MORLIFE clutch going strong after 1695 hours, working in sand."

"MORLIFE clutches last 950 hours longer, without adjustment."

"MORLIFE clutch needs adjustment once a month, instead of daily."

"MORLIFE requires lighter handle pull and one tenth the adjustments."

"MORLIFE pulls harder and lasts six to ten times longer."



"Won't buy a unit that isn't equipped with Durable MORLIFE clutch."

New MORLIFE* CLUTCHES and CLUTCH PLATES Give—

MORE Clutch Life (400% MORE)
MORE Torque Capacity (100% MORE)
MORE Heat Resistance (50% MORE)

These new ROCKFORD Clutches and Clutch Plates have been developed by ROCKFORD Clutch Engineers to take full advantage of recently discovered facing material. Actual field tests on heavy duty equipment have resulted in adoption of MORLIFE clutches by builders of tractors, earth movers, graders, shovels, cranes, trucks, oil field equipment and power units. For information how these new Rockford MORLIFE Clutches will improve the operation and increase on-the-job hours of heavy duty machines, write Department E.

ROCKFORD Clutch Division BORG-WARNER

313 Catherine Street, Rockford, Illinois, U.S.A.

CLUTCHES

Pan American Southern Corp. (Standard Oil of Indiana), 1040 St. Charles St., New Orleans, La.

▲ **Brezina Constr. Co., Inc.**, 109 Steele St., Rapid City, S. D. LB $998,000. (4 bidders) general constr. remodel part of existing HOSPITAL and constr. new addn. approx. 66,130 sq. ft., MINOT, N. D. Trinity Hospital, H. Lehaug, mgr., Minot, N. D. Bids June 20. CD 5/31.
Sornsin Co., 116 Roberts St., Fargo, N. D. LB $394,000. (4 bidders) mechanical work (Minot, N. D.)

▲† **Construction Industries**, Salina, Kan. CA $1,010,061. Group I, 2 BATTALION HEADQUARTERS, BRANCH PX BLDG., 1 story REGIMENTAL DISPENSARY BLDG., SERVICE CLUB, Spec. 56-94, FORT RILEY, KAN. U. S. Eng., Federal Office Bldg., Kansas City 6, Mo. Bids June 28, awarded June 29. CD 6/13.

▲ **E. Eisenhauer**, P.O. Box 7056, Corpus Christi, Tex. CA $1,420,000. Mary Carroll Senior HIGH SCHOOL, CORPUS CHRISTI, TEX. Corpus Christi Independent School Dist., 515 N. Carancahua St., Corpus Christi, Tex. Bids May 29, awarded June 11. CD 6/8.

† **Robert E. McKee General Contractor, Inc.**, 1918 Texas St., El Paso, Tex. CA $750,550. three 3 story BACHELOR OFFICERS QUARTERS, utilities, ENG-29-005-56-81, Fort Bliss, EL PASO, TEX. U. S. Eng., P.O. Box 1538, Albuquerque, N. M. Bids June 26. CD 5/22.

▲ **Riedesel-Lowe Constr. Co.**, 1780 E. Pershing Blvd., Cheyenne, Wyo. LB $1,264,000. general constr. BANK BLDG., CASPER, WYO. Casper National Bank, 2nd and Center Sts., Casper, Wyo. Bids June 20. CD 5/25.

▲† **Mack Constr. Co. & W. E. Best Constr. Co.**, 2403 Jasper St., Wichita Falls, Tex. CA $1,016,459. (jointly), POST HEADQUARTERS, ENLISTED MEN'S CLUB and REGIMENTAL DISPENSARY, CAMP CARSON, COLO. U. S. Eng., 1709 Jackson St., Omaha, Neb. CD 7/6, under LB.

FAR WEST

BUILDINGS—BA

▲ **Calif., San Francisco**—EXHIBIT HALL—BA 8/1—City and San Francisco Co., City Hall, 1 story 90,000 sq. ft. exhibit hall at Civic Center Plaza and connected to civic auditorium, $2,900,000. Plans deposit $100 CD 11/5/54.

HEAVY CONSTRUCTION—LB & CA

▲ **Healy Tibbetts Constr. Co.**, 411 Brannan St., San Francisco, Calif., CA $2,529,044. Ocean Outfall for sludge discharge at Hyperion Treatment Plant, El Segundo, LOS ANGELES, CALIF. City, City Hall, Los Angeles, Calif. Bids June 27, awarded July 2. CD 6/29, under LB.

▲ **Fredrickson & Watson and Ransome Co.**, 873 81st Ave., Oakland, Calif., LB $1,577,778, (6 bidders) constr. San Pablo Dam Rd., near El Sabrante, MARTINEZ, CALIF. Conta Costa Co., Court House, Martinez, Calif. CD 3/10/55.

▲ **Shaw & Estes Assocs.**, Box 2399, Dallas, Tex., CA $4,011,338, est. $3,000,000, engine test facility, Edwards Air Force Base, ENG-04-353-113, MUROC, CALIF. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids June 29, awarded July 2. CD 5/31.

▲† **Bumstead-Walford Co.**, 55 New Montgomery St., San Francisco, Calif., LB $1,403,277 (1); LB $1,383,977 (2); LB $1,358,977 (3); LB $1,257,977 (4), (2 bidders) steam heat plant, San Francisco Naval Shipyard, NOy 91669, Spec. 50089, SAN FRANCISCO, CALIF. Dist. P. Wks. Office, 12th Naval Dist., San Bruno, Calif. Bids June 26. CD 6/8.

BUILDINGS—LB & CA

▲ **Shuck Constr. Co.**, 535 Pontius St., Seattle, Wash. CA Total est. $1,000,000. 3 one story steel frame, masonry, rein.-con. buildings for formaldehyde PLANT, KENT, WASH. Borden Co., 6010 Airport Way, Seattle 4, Wash. CD 11/28, under Wash., Seattle.

▲ **L. B. MacDonald**, 721 N. C St., Tacoma, Wash. CA est. $1,000,000. 12 story, rein.-conc. OFFICE, TACOMA, WASH. Weyerhaeuser Timber Co., Tacoma Bldg., Tacoma, Wash. CD 11/22.

CANADA

BUILDINGS—BA

▲ **Ont., Toronto**—OFFICE—BA 7/27—Canadawide Investments Ltd., 330 Bay St., steel framed office bldg., and rein.-con. parking garage, 188 University Ave. $2,500,000. Plans deposit $25. Peter Caspari, 102 Eglinton Ave. E., archt. Wallace, Carruthers & Assocs., Ltd., 92 Yorkville Ave., engrs. CD 3/28.

HEAVY CONSTRUCTION—LB & CA

▲ **BRITISH COLUMBIA**—B. C. Govt., Parliament Bldgs., Victoria,
B. C.—**G. & M. Constr. Ltd.**, Harrison Hot Springs, B. C. LB $167,169 (4 bidders) reconstr. 1.75 mi. Trans-Canada Hy., Cheam Creek-Twin Bridges Sect. Proj. 750;
B. C.—**Dawson, Wade & Co. Ltd.**, 775 Clark Dr., Vancouver, B. C., LB $1,533,361, reconstr. 8.1 mi. Trans-Canada Hy. Lytton-Tank Hill Sect., Proj. 762;
B. C.—**P. F. Law Constr. Ltd.**, 500 Beatty St., Vancouver, B. C., LB $821,459 (2 bidders) constr. 6.71 mi. Southern-Trans-Provincial Hy. Summit Creek-Creston, Proj. 756.
ONTARIO—Dpt. Hys., Parliament Bldgs., Toronto,
Rayner & Armstrong, Ltd., 3130 Bathurst St., Toronto, Ont., CA $923,352, Contr. 56-68, grading, culverts, granular base 11.4 mi. Hy. 17 from near White River. Bids June 27, awarded June 29. CD 7/5, under LB.

Dick Constr. & Eng. Co. Ltd., 63 Empire St., Welland, Ont., CA $800,000. 5 mi. 33- to 84-in. concrete sewers with catch basins, manholes and connections, WELLAND, ONT. Crowland Twp., 636 King St. S., Welland, Ont. Graham Reid & Assocs., Ltd., 264 Avenue Rd., Toronto, Ont., engrs. Awarded July 5.

BUILDINGS—LB & CA

▲ **Commonwealth Constr. Co. Ltd.**, 700 Taylor St., Vancouver, B. C., CA Est. $38,500,000. bleached sulphate PLANT, CROFTON, B. C. British Columbia Forest Products, Ltd., 995 W. 6 Ave., Vancouver, B. C. CD 10/18/54.

▲ **B. Perini & Sons Canada Ltd.**, 49 Jackes Ave., Toronto, Ont., CA Est. $4,000,000. 12 story approx. 160,000 sq. ft. rein.-con. fdn. and frame OFFICE. Bloor and Jarvis Sts., TORONTO, ONT. Glenmore Holdings, Ltd., 366 Adelaide St. W., Toronto, Ont. Bregman & Hamann, 7 Adelaide St. E., Toronto, Ont., archts Farkas & Barron of Canada, Ltd., 7 Adelaide St. E., Toronto, Ont. engrs. Awarded June 20.

ALASKA

HEAVY CONSTRUCTION—LB & CA

▲† **Patti-MacDonald Constr. Co.**, 1310 S. Grant Blvd., St. Louis, Mo., CA $1,919,765, est. $3,227,324, Items 2, 3, 4, and 5 for POL terminal storage facilities, Inv. 56-24, FORT RICHARDSON, ALASKA. U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash. Bids June 27. CD 7/5, under LB.

U. S. POSSESSIONS

HEAVY CONSTRUCTION—LB & CA

▲† **Hawaiian Dredging Co.**, Honolulu, T. H., CA Est. $17,000,000. aviation facilities, MIDWAY ISLAND. Bureau Yards & Docks, Dpt. Navy, 18 St. and Constitution Ave. N. W., Wash. 25, D. C.

AMERICANS ABROAD

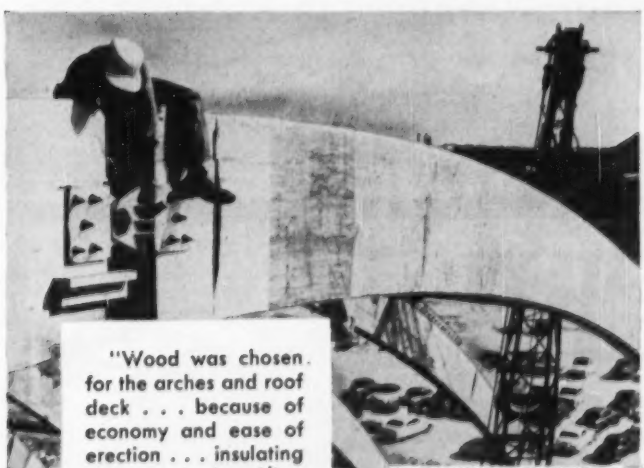
HEAVY CONSTRUCTION—BA

▲ Bids are being taken on the following project under international competitive bidding of NATO.

FRANCE

Ministere de l'Industrie et du Commerce, Service Special des Depots d'Hydrocarbures, 85 Boulevard du Montparnasse, Paris, three petroleum storage depots with reservoirs partially undeveloped to be constructed in the regions of Marseille-Lavalduc, $1,700,000; Laon, $1,400,000; Metz, $1,400,000. Firms interested should register their intentions to bid before July 17 indicating in which phase of work they are interested, c.i., civil engineering, tank work or pipe work and equip. A brochure describing the NATO international

Another record for wood construction and TECO connectors!



"Wood was chosen for the arches and roof deck . . . because of economy and ease of erection . . . insulating and sound-absorbing qualities . . . a relatively high degree of fire-resistance, which has long been recognized in heavy timber construction."

The world's longest wood arches, spanning 242½ feet in Florida's new Jai Alai Fronton, West Palm Beach, were fabricated by Unit Structures, Inc., Peshtigo, Wisc., using TECO shear plates in base, crown, and splice connections.

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▲ Bids are being taken on the following project under international competitive bidding of NATO.

NETHERLANDS

DeDirecteur Gebouwen, Werken en Terreinen, Bagijnestraat, 40, The Hague, referring to ICB No. 31, supply of steel pipe, valves and tees, steel sheets for POL storage tanks; diesel electric aggregates and safety sys., $1,750,000. Firms interested should express their desire to tender by July 13. A brochure describing the NATO international bidding program is available on request from the Trade Development Div., Bureau of Foreign Commerce, U. S. Dpt. Commerce, Wash. 25, D. C., U.S.A.

PROPOSED PROJECTS

WATER SUPPLY

▲ **O., Cleveland**—City, Dpt. P. Utilities, Emil J. Crown, dir., City Hall, Zone 14, route of Trebiskey-Oorsch water main to be known as Trebisky-Richmond Main, Sect. 1. Portion 1, main in Highland Rd. from end of existing 54 in main to Trebisky Rd. and in Trebisky Rd. from Highland to Anderson; Portion 2, main in Mayfield Rd. from Belvoir Blvd. to Oorsch Rd.; Portion 3, main in Richmond Rd. from Clubside to Cedar Rds. $1,100,000; 20 in. water main in Canal Rd. from E. 71 St. to Warner Rd. and 12 in. restricted main in Warner Rd. 650 ft. north, $75,000; Proj. C-7, raw water pumping imprvt. at Nottingham Pumping Station, incl. furnishing, installing two raw water pumps with necessary appurtenances, $130,000; Proj. C-8, second high service pumping imprvt. at Nottingham pumping station, incl. removal of two existing 15 m.g.d. filtered water pumps and furnish, install two 25 m.g.d. filtered water pumps complete for operation with necessary appurtenances, $220,000. Bids this summer. Havens & Emerson, 640 Leader Bldg., Zone 14, consult.-engrs. George Hamlin, c/o owner, engr.

SEWERS, WASTE DISPOSAL

▲ **Calif., Merced**—City, City Hall, expand sewer plant. $1,260,000. Paul L. Adamson, 444 Roman St., Palo Alto, consult. engr. CD 11/17/49.

▲ **Calif., Santa Ana**—Orange Co., Court House, voted bonds June 5, flood control system.

A-1, Coyote Creek Channel, $2,205,000.
A-2, Brea Creek Channel, $411,600.
A-3, Fullerton Creek Channel, $1,666,000.
A-4, Brea Canyon Channel, $336,000.
A-5, East Brea Channel, $122,500.
B-1, Carbon Canyon Creek Channel, $3,785,250.
B-2, Moody Creek Channel, $156,800.
B-3, West Anaheim Storm drain parallel, $441,000.
C-1, Los Alamitos Channel, $771,750.
C-2, Bolsa Chica Channel, $980,000.
C-3, Anaheim-Barber City Channel, $1,445,500.
C-4, Westminster Channel, $220,500.
C-5, East Garden Grove-Witersburg Channel, $3,234,000.
C-6, Ocean View Channel, $198,450.
D-1, Huntington Beach Channel, $1,274,000.
D-2, Talbert Channel, $274,400.
D-3, Greenville-Banning Channel, $1,783,600.
D-4, Fairview Channel, $98,000.
E-1, Santa Ana River, $4,557,000.
E-2, Carbon Canyon Creek Diversion Channel, $980,000.
E-3, Carbon Canyon Dam, $3,381,000.
E-4, Atwood Channel, $294,000.
E-5, Richfield Channel, $294,000.
E-6, Jefferson-Walnut Channel, $149,940.
E-7a, Olive-Orange Channel, Palmyra Diversion, $245,000.
E-7b, Olive-Orange Channel, Collins Diversion, $196,000.
E-8, Santiago Creek Channel, $980,000.
E-9, Villa Park Dam, $3,381,000.
F, Retarding Basins Areas, $2,400,000.
F-1, Santa Ana-Delhi Channel, $387,100.
F-2, Santa Ana Gardens Channel, $245,000.
F-3, Paularino Channel, $147,000.
F-5, San Diego Creek Channel, $588,000.
F-6, Peters Canyon Channel, $441,000.
F-7, El Modena-Irvine Channel, $735,000.
F-8, Lane Road Channel, $183,750.
F-9, Barranca Road Channel, $39,200.
F-10, Santa Ana-Santa Fe Channel, $303,800.
F-11, Southwest Tustin Channel, $58,800.
F-12, North Tustin Channel, $176,400.
F-13, Red Hill Channel, $102,900.
F-14, Irvine-Peters Channel, $235,200.
I-2, Laguna Canyon Channel, $355,250.
L-1, San Juan Creek Channel, $686,000.
L-2, Trabuco Creek Channel, $392,000.
L-5, Oso Creek Channel, $236,310.
G-1, East Newport Heights Channel, $25,000.
G-2, East Costa Mesa Channel, $25,000.
G-2a, East Costa Mesa-17th Street Channel $5,000.
H-1, Del Mar Dam, $20,000.
H-2, Puck Gulley Beach Outlet, $25,000.
H-3, LosTrancos Beach Outlet, $15,000.
H-4, Moro Canyon Beach Outlet, $10,000.
H-5, Los Trancos Canyon Dam, $30,000.
H-6, Muddy Canyon Dam, $30,000.
H-7, Moro Canyon Dam, $30,000.
I-1, Laguna Canyon Beach outlet, $40,000.
I-3, Bluebird Canyon Channel, $60,000.
J-1, Aliso Canyon Beach outlet, $60,000.
J-2, Aliso Canyon Lower Retarding Basin, $50,000.
J-3, Aliso Canyon Dam, $50,000.
J-4, Aliso Canyon Channel, $80,000.
K-1, Salt Creek Beach Outlet, $30,000.
L-3, Trabuco Canyon Dam, $100,000.
L-4, San Juan Canyon Dam, $100,000.
M-1, Prima Deshecha Canada Beach Outlet, $30,000.
M-2, Secunda Desecha Canada Channel, $150,000.
M-3, Marquita Beach Outlet, $15,000.
M-4, Los Lobos Beach Outlet, $15,000.
M-5, Secunda Desecha Canada Dam, $50,000. (Correction, Bond election result). CD 6/19.

▲ **Mich., Ann Arbor**—City, Mayor William E. Brown, Jr., City Hall, sewerage sys. expansion, $2,000,000, George H. Sandenburgh, city engr.

▲ **Mich., Detroit**—City, Glenn C. Richards, comr., City-County Bldg., major storm sewer projects. Schoolcraft Relief Sewer, $7,000,000; Livernois Relief Sewer, $3,000,000; Six and Seven Mile Rd. Relief Sewer, $9,500,000; Ashland Relief Sewer, $8,400,000; Kercheval-Algonquin Relief Sewer, $4,500,000; River Rouge channel imprvs., $2,640,000; Baby Creek enclosure, $4,160,000, M. F. Wagnitz, City engr. CD 11/12/53.

▲ **O., Cincinnati**—Comrs. Hamilton Co., Court House, bond election Nov. 6, sewers, various locations, $4,000,000. George Lemmel, engr.

▲ **O., Cleveland**—City, Dpt. P. Service, Louis L. Drasler, dir., City Hall, Zone 14, bond election Nov. 6, incinerators, Adache Eng. Co., Old Arcade, Zone 14, consult.-engr.; storm and sanitary sewers, $6,000,000. CD 11/7/52.

▲ **O., Euclid**—City, City Hall, 585 E. 222 St., Cleveland, Zone 23, bond election Nov. 6, sewage treatment plant, $4,800,000. Havens & Emerson, 640 Leader Bldg., Cleveland, Zone 14, consult. engrs. CD 9/6.

BRIDGES

▲ **Calif., Long Beach**—Long Beach Harbor Dpt., 1333 El Embarkadero St., Ninth St. Bridge over Los Angeles River, $1,500,000. Moffat & Nichols, 122 W. 5 St., consult. engrs. R. R. Schoemacker, c/o owner, engr. CD 9/3/54.

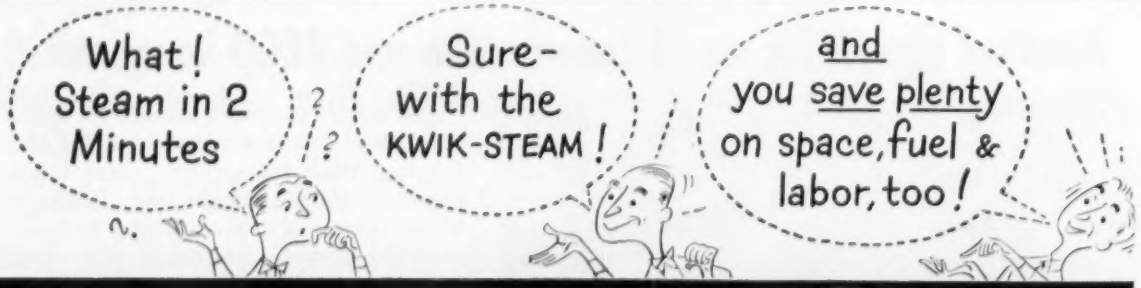
▲ **CONNECTICUT**—State Hy. Dpt., 165 Capitol Ave., Hartford,

Tolland Co.—Wilbur Cross Parkway, several addnl. grade separation structures between Vernon and Mass. State Line, Ashford, Tolland, Union and Willington, $15,000,000.

STREETS AND ROADS

▲ **CONNECTICUT**—State Hy. Dpt., 165 Capitol Ave., Hartford,

Fairfield Co.—reconstr. Rte. U.S. 6 between Danbury and Sandy Hook, Bethel, Danbury and Newtown, $10,000,000.



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Waterbury Expressway from Hamilton Ave.-Silver St., viaduct to Marion, Southington, Waterbury and Wolcott, $10,000,000.

Tolland Co.—Wilbur Cross Parkway, wid'n. of Travel Way and resurf., Ashford, Union and Willington, $5,000,000.

Windham and Tolland Counties—bit. surf. tr. 9.2 mi. Conn. 89, Ashford and Mansfield, $75,000.

▲ **Mich., Ecorse**—City, City Council, 4373 High St., $1,250,000 bond election Nov. 6, paving 22 mi. alleys.

▲ **O., Cleveland**—City, City Hall, Zone 14, bond election Nov. 6, opening, extending, widening and relocating limited access highways. $6,000,000; grading, paving, draining and resurf. streets. $5,000,000. Jay Katz, city engr. CD 11/7/52.

AIRPORTS

▲ **Colo., Colorado Springs** — STADIUM — Air Force Academy, P. O. Box 1670, 50,000 seat, concrete stadium for Air Force Academy. $3,329,000. Skidmore, Owings & Merrill, 3333 N. El Paso St., consult. engrs.-archts. CD 8/5/54.

▲ **O., Columbus**—AIRPORT—City, City Hall, bond election Sept. 14, Port Columbus Airport. $3,975,000. CD 2/21/51.

LATIN AMERICA

▲ **Mexico, Monterrey**—PLANT—Cia Fundidora de Fierro y Acero de Monterrey, S. A. Monterrey, plans modernizing steel plant. $26,000,000. Export-Import Bank made loan. Freyn Eng. Dpt. Koppers Co., Koppers Bldg., Pittsburgh, Pa., U.S.A., Arthur G. McKee & Co., 2300 Chester St., Cleveland O., and Blaw Knox Co., Farmers Bank Bldg., Pittsburgh, Pa., U.S.A., consult. engrs.

PUBLIC BUILDINGS

▲ **Calif., Santa Ana**—JUVENILE HALL—Orange Co., Court House, plans by Wildman & Faulkner, Spurgeon Bldg., juvenile hall, $1,500,000.

▲ **Colo., Fort Collins**—DORMITORY—Colorado A & M College, Campus, Fort Collins, womens' dormitory, $1,350,000.

▲ **Kan., Hutchinson**—SCHOOL—Bd. Educ., $3,800,000 bond election Nov. 6, schools, school addns.

▲ **Kan., Newton** — SCHOOL — Bd. Educ. plans by Schmidt, McVay & Peddie, 1832 E. Second St., Wichita, Intermediate or Junior High School, school addns. $1,250,000.

▲ **Mass., Lowell**—INDUSTRIAL RESEARCH BLDG.—State, Dpt. Educ., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, plans by Korkyn & Browne, 184 Boylston St., Boston, E-812, 5 story, irregular shape industrial research bldg., Lowell Textile Institute, $1,700,000. W. Chester Browne & Assoc., 184 Boylston St., Boston, consult.-engrs. CD 1/6.

▲ **Miss., University**—DORMITORIES—State, Woolfolk State Office Bldg., Jackson, women's dormitory, men's dormitory, 13 bldgs. for married students at University of Mississippi, $2,600,000.

▲ **Mo., Kansas City**—HOUSING—Kansas City Housing Auth., 1220 Independence Ave., Kansas City, Mo., plans by Tanner & Mitchell, 6244 Troost Ave., Kansas City, Mo., 250 dwelling units west of Pennway between 21 and 17 Sts., also community bldg., Proj. No. MO-2-10. $3,500,000.

▲ **Neb., Lincoln**—LIBRARY—City, City Hall, defeated $1,500,000 bonds June 26, main library. CD 2/29.

▲ **Neb., Lincoln**—MEDICAL CENTER—City, City Hall, defeated $4,800,000 bonds June 26, medical center. CD 4/26.

▲ **Neb., Lincoln**—CITY-COUNTY—City, City Hall and Lancaster Co., Court House, defeated $4,200,000 bonds June 26, city-county bldg. CD 2/29.

▲ **N. J., Boonton**—SCHOOL—Bd. Educ., Boonton-Montville Regional School Dist., high school for Lincoln Park, Montville, town of Boonton and Twp. of Boonton. $2,500,000.

▲ **N. J., North Haledon**—SCHOOL—Prospect Park-North Haledon Regional High School Dist., high school for new regional district of Haledon, North Haledon and Prospect Park. $1,315,000.

▲ **N. Y., Mineola**—OFFICE—County Executive, Nassau Co., Old County Court House, plans by Chapman, Evans & Delehanty, 50 Broadway, New York, Zone 4, 6 story Nassau County Office off Old Country Rd. $2,000,000. CD 2/7.

▲ **N. Y., Oneida**—SCHOOL—Bd. Educ. voted $3,218,000 bonds June 16, high school. CD 6/1.

▲ **O., Bedford**—HIGH SCHOOL—BA 8/8—Bd. Educ., Dale Heskett, supt., 91 Tarbell St., high school addn. $3,000,000. C. B. Rowley & Assoc., Keith Bldg., Cleveland, Zone 15, archt. CD 5/11.

▲ **O., Cincinnati**—HOUSING—Cincinnati Metropolitan Housing Auth., Armory Ave., plans by Kruckmeyer & Strong, Carew Tower, 2 story, basmtless, 120 unit brick veneer bldgs., Sutter Ave. $1,300,000. Bids in August. Wm D. Ehlers, Union Trust Bldg., consult. engr. CD 1/6/50.

▲ **O., Cleveland**—MUNICIPAL COURT—City, City Hall, Zone 14, bond election Nov. 6, municipal court Bldg. $2,700,000. Anthony Gattozzi, city archt.

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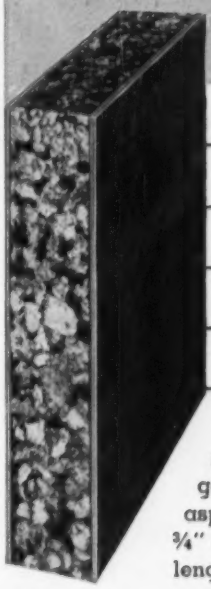

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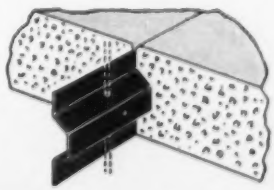

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▲ **O., Grove City**—SCHOOLS—Bd. Educ., Southwest School Dist., 1390 Harrisburg Pike, Grove City, voted $2,500,000 bonds June 26, three elementary schools; high school. CD 5/31.

▲ **O., Lakewood**—MUNICIPAL—City, 14532 Lake Ave., Zone 7, bond election Nov. 6, municipal bldg. $1,500,000. Garfield, Harris, Robinson & Schafer, 1740 E. 12 St., Cleveland, Zone 14, archts. CD 6/18.

▲ **O., Louisville**—SCHOOLS—Bd. Educ., Louisville, bond election Nov. 6, new elementary school; 3 school addns. $1,150,000.

▲ **O., Orange**—SCHOOLS—Bd. Educ., Chagrin Blvd., bond election Nov. 6, new elementary school, existing buildings addns. $1,250,000.

▲ **O., Parma**—SCHOOLS—Bd. Educ., Carl C. Byers, supt., 5401 W. 54 St., Zone 29, bond election Nov. 6, two Junior High Schools-classrooms only, 2 elementary schools; garage to house 23 school buses. $3,200,000. CD 5/11/53.

▲ **Pa., Elizabethtown** — SCHOOL — Elizabethtown Area School Dist., Elizabethtown, high school, $2,400,000.

▲ **Utah, Logan**—DORMITORIES—Utah State Agricultural College, Logan, plans by Grix, Mueller & Plowman, Administration Bldg., Washington Terrace, dormitories. $2,000,000.

▲ **Ont., Brampton**—HOSPITAL—Province of Ontario, Parliament Bldgs., Toronto, 762 bed hospital for old persons, southwest of here. $5,000,000.

▲ **Que., Montreal**—RESEARCH—Dpt. P. Wk., Hunter Bldg., Ottawa, Ont., plans by Dobush & Steward, 4635 Sherbrooke St. W., 2 story pulp and paper research bldg., Pointe Claire. $2,250,000, incl. equip.

COMMERCIAL BUILDINGS

▲ **Calif., San Francisco**—HOTEL, etc.—Owner c/o Bertzka & Knowles, archts., 85 Post St., San Francisco, hotel, garage and office bldg., Vanness Ave. $10,000,000.

▲ **Calif., Tustin**—SHOPPING CENTER—Klatt & Wilde, c/o Underhill & Wagner, archts., 4313 Leimert Blvd., Los Angeles, 192,000 sq. ft. shopping center, 17th St. and Tustin Ave. $2,000,000.

▲ **Conn., Wethersfield**—SHOPPING CENTER—Arlington Holding Co., 521 Fifth Ave., New York, N. Y., plans by Lathrop Douglass, 518 Fifth Ave., New York, N. Y., Turnpike Shopping Center, 44 acre tract on Berling Turnpike, $4,000,000. To go ahead in the Fall. CD 4/9.

▲ **Ill., Chicago**—OFFICE—The Jewish Federation of Chicago, 231 S. Wells St., plans by A. Epstein & Sons, 2011 W. Pershing Rd., 6 story, brick office bldg., Franklin and Madison Sts. $1,500,000.

▲ **Ill., Chicago**—APARTMENT—John J. Mack, 201 E. Walton St., Zone 11, plans by Hausner & Macsai, 140 N. Dearborn St., 24 story, 250-unit, arch-shaped apartment, 1150 N. Lake Shore Dr. $4,000,000.

▲ **Iowa, Cedar Rapids**—HOTEL—Roosevelt Hotel Co., Cedar Rapids, plans by Holobird, Root & Burgee, 180 N. Wabash St., Chicago, Ill., and H. R. Green Co., engr.-archt., Cedar Rapids, 12 story hotel addn. $1,000,000.

▲ **Iowa, Des Moines**—HOUSING—Drake University, 25 and University Sts., men's dormitory. $1,375,000. CD 5/24/46.

▲ **Minn., Minneapolis**—Y.M.C.A. BLDG.—Young Men's Christian Assn., 30 S. Ninth St., plans by Lang & Raugland, 802 Wesley Temple Bldg., Central Y.M.C.A. Bldg. addn., remodeling, Ninth St. and LaSalle Ave., $1,250,000.

▲ **Mo., St. Louis County**—COMMUNITY CENTER—Jewish Community Centers Assn., Bernard Fischlowitz, pres., 724 N. Union Blvd., St. Louis, Zone 8, community center, incl. YMHA-YWHA bldgs. with auditorium and facilities for outdoor activities and parking area, on 108 acre tract at Lindbergh Blvd. and Schuetz Rd. $2,000,000. (Site changed). CD 5/23/55, under Mo., Olivette.

▲ **N. Y., New York**—RESEARCH—New York Society for Relief of Ruptured & Crippled, 535 E. 70 St., plans by Rogers & Butler, 219 E. 44 St., New York, research bldg., 537-445 E. 71 St. $1,200,000.

▲ **Pa., Camp Hill**—HOSPITAL—Harrisburg Catholic Diocese, 111 State St., Harrisburg, hospital bldg. for West Shore Catholic Hospital, 21 St. and By-Pass. $4,000,000.

▲ **Pa., Phila.**—HOSPITAL—St. Christopher's Hospital for Crippled Children, 2600 N. Lawrence St., plans by Martin, Stewart & Noble, 117 S. 17 St., hospital, addn., surgical wing, expansion program, $4,000,000.

▲ **Wis., West Allis**—HOME FOR AGED—Methodist Manor, 2832 W. Wisconsin Ave., Milwaukee, plans by Mark F. Pfaller & Assocs., 7613 W. State St., Wauwatosa, 1 and 2 story, rein.-con., brick home for aged. $1,750,000.

▲ **Man., Winnipeg**—OFFICE—Great West Life Assurance Co., Lombard St., plans by Marani & Morris, 1250 Bay St., Toronto, Ont. and Moody & Moore, 295 Broadway, Winnipeg, 5 story 219,000 sq. ft. office, 8-acre site. $10,000,000. CD 1/4.

INDUSTRIAL BUILDINGS

▲ **Ill., Montgomery**—FACTORY, etc.—All Steel Equipment, Inc., 152 Griffith Ave., Aurora, plans by Johnson & Johnson, 111 W. Washington St., Chicago, factory, office bldg. and parking lot, W. of Ill. 31, 2 blocks S. of Aurora city limits, $2,500,000.

▲ **N. Y., Kingston** — LABORATORY — International Business Machines Corp., 590 Madison Ave., New York, Zone 22, plans by Giffels & Vallet, Inc., 1000 Marquette Bldg., Detroit, Mich., 150,000 sq. ft. laboratory for Military Products Div. $2,000,000.

▲ **O., Garfield Heights**—PLANTS—Mid-West Metallic Products, Inc., 1773 E. 21 St., Cleveland, Zone 14, plans by Dalton & Dalton, The Arcade, Cleveland, Zone 14, seven plants; 1 story, 1,000,000 total sq. ft. brick, concrete constr. $9,000,000. Bids in about 6 months.

▲ **Tex., Garland**—ENGINEERING CENTER, etc.—Temco Aircraft Corp., Garland, plans by E. G. Hamilton & George F. Harrell, Republic Natl. Bank Bldg., Dallas, 100,000 sq. ft. engineering center bldg. $1,000,000; warehousing, $150,000; grading and grounds bldg. site area development, $45,000.

▲ **Tex., Port Neches**—PLANT—Neches Butane Products Co., Port Neches, plant expansion $23,000,000; warehousing, $200,000; drainage. $90,000. CD 3/5.

▲ **Wis., Oak Creek** (P. O. Milwaukee)—MAUFACTURING PLANT—Louis Allis Co., 427 E. Stewart St., Milwaukee, motor mfg. plant. $2,000,000.

UNCLASSIFIED

▲ **Idaho** — RURAL DISTRIBUTION LINES — Clearwater Power Co., Lewiston, 111 mi. rural distr. lines, 64 mi. 34 KV transmission line, 29 mi. 69 KV transmission line, sys. imprvs., Nez Perce Co. $1,660,000. CD 6/5/47.

▲ **N. Y., Brooklyn** — SHIPPING TERMINAL — Dpt. Marine & Aviation, Pier A, North River, New York, Zone 4, shipping terminal, incl. 1,000x260 ft. pier and shed at 39 St. $6,000,000, Frederic R. Harris, Inc., 27 William St., New York, consult. engr. CD 9/9.

▲ **Oregon**—RURAL DISTRIBUTION LINES—Coos-Curry Electric Co-operative, Coquille, 36 mi. rural distr. line, sub-headquarters facilities, 37 mi. 69 kv rural distr. line, sub-station and sys. imprvs., Coos Co. $47,000,000. CD 4/16/52.

▲ **Tennessee**—RURAL DISTRIBUTION LINES—Fort Loudoun Electric Co-operative, Madisonville, 60 mi. rural distr. lines, sys. imprvs., Loudon Co. $1,065,000. CD 3/10/48.

▲ **Texas**—PIPE LINE—Natural Gas Pipeline Co. of America, 20 N. Wacker Dr., Chicago, Ill., 25 mi. pipe line, from Quinduno Field to connect with owners main line, $2,166,300; compressor station units, $600,000; metering facilities installations, $100,000; various field lines, in Quinduno fields, $200,000, foregoing near Miami, Roberts Co. CD 6/17/55.

▲ **Saskatchewan**—PIPE LINE—South Saskatchewan Pipe Line Co. (Socony-Vacuum Oil Co. of Canada, Ltd., Woodley (Canadian) Oil Co. and Southern Production, Inc.) Regina, 59 mi. 12 in. pipe line to connect Dollard Field with Regina. $2,900,000. Permit granted. CD 10/7/53, under Socony-Vacuum Oil Co., as owner.

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STREETS AND ROADS

July 24 Massachusetts

▲† **Massachusetts**—BA On Or About 8/17—U. S. Eng., 150 Causeway St., Boston, Zone 14, Buffumville Dam, appurtenant structures, Little River, town of Charlton, approx. 10 mi. southwest of Worcester, consisting of control and diversion of water at site, concrete control house, ogee-section spillway with gallery, gate controlled outlet conduits, non-overflow sections, spillway training walls, short approach channel at intake, earth dam with impervious, random and pervious sections with rock fill slope protection on upstream and downstream faces and downstream toe drainage sys.; earth dike at Pierpoint Meadow Pond, modification treatment to existing Pierpont Meadow Pond Dam; reservoir clearing; access and connecting roads, headwalls, drains, flagpole, base; utilities, utility bldg., garage, operator's quarters, general landscaping, CIVENG-19-016-57-2, $1,500,000-$2,000,000.

BUILDINGS—LB & CA

▲ **Vappi & Co., Inc.**, 246 Sidney St., Cambridge, Mass. CA **$1,500,000.** PLANT addn., NEWINGTON, N. H. Simplex Wire & Cable Co., c/o Charles T. Main, Inc., engr., 80 Federal St., Boston, Mass. CD 6/4.

▲ **John A. Volpe Constr. Co.**, 54 Eastern Ave., Malden, Mass. CA **$2,000,000.** Cardinal Spellman Catholic HIGH SCHOOL, Court St., BROCKTON, MASS. R. C. Diocese of Boston, Chancery Office, 1 Lake St., Brighton, Mass. CD 9/2.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

July 27 Pennsylvania July 31 Maryland

STREETS AND ROADS

July 24, Maryland, New Jersey July 26 New York
July 27 Pennsylvania July 31 New Jersey

BUILDINGS—BA

▲ **N. Y., New York**—SCHOOL—BA 8/16—Bd. Educ., Bureau Constr., 42-15 Crescent St., Long Island City, Zone 1, modification, addn. to Junior High School 52, Academy St. and Broadway, Manhattan Boro, $2,086,750. Plans deposit $20 general constr., $8 each for plumbing and drainage, heating and ventilating, electrical work and lighting fixtures.

▲ **N. Y., New York**—SCHOOL—BA 8/16—Bd. Educ., Bureau Constr., 42-15 Crescent St., Long Island City, Zone 1, P. S. 8 East 201 St. and Mosholu Parkway, Bronx Boro, $2,113,100. Plans deposit $25 for general constr. $7 each plumbing and drainage, heating and ventilating, electrical work and lighting fixtures. CD 1/20/55.

BUILDINGS—SLC

▲ **N. Y., Latham Corners**—SHOPPING CENTER—Latham Enterprises, Inc., 111 S. Main Ave., Albany, soon lets contract shopping center incl. 50 stores, parking lot at intersection of U. S. Rte. 9 and N. Y. S. Rte. 7 at Latham Circle, $5,000,000. Howard T. Fisher & Assoc., 270 Park Ave., New York, Zone 17, archts. Eipel Eng. Co., 101 Park Ave., New York, Zone 17, consult. engr. CD 5/4.

HEAVY CONSTRUCTION—LB & CA

▲ **Electrical Constructors, Inc.**, 1343 Holly St., Columbus, O. CA **$1,345,465.** electrical work at Barnhart Island Switchyard near Massena, St. Lawrence Co., Spec. No. PA 5-14032, St. Lawrence Contr. No. 26, NEW YORK. Power Authority of the State of New York, 270 Broadway, New York 7, N. Y. CD 6/28, under LB.

BUILDINGS—LB & CA

▲ **Mars Associates, Inc., & Normel Constr. Corp.**, 271 Church St., New York 13, N. Y. LB **$1,063,000.** (5 bidders) general constr. for rehabilitation and modernization of main bldg. and laboratory bldg. at Greenpoint HOSPITAL, Skillman, Debevois and Kingland Aves., and Jackson St., BROOKLYN, N. Y. Dpt. P. Wks., Municipal Bldg., New York 7, N. Y. Bids June 29, CD 6/19;
Forsythe Plumbing & Heating Corp., 234 W. 55 St., New York 19, N. Y. LB **$396,787** (5 bidders) plumbing work (Brooklyn, N. Y.).

▲ **Louis Gressani Contg.**, 128 Buffington Rd., Syracuse, N. Y. CA **$2,387,080.** 4 elementary SCHOOLS for towns of Alcoa, Haverstock, Nightingale and Louisville, MASSENA, N. Y. Central School Dist. No. 1, Massena, N. Y. Bids July 5. CD 6/13.

▲ **39 Gramercy Park Corp.**, 349 E. 149 St., New York, N. Y. Owner Builds. **$1,500,000.** 17 story APARTMENT, 260-64 Third Ave. and 147-59 E. 21 St., NEW YORK, N. Y. CD 11/29.

▲ **Barlow Woods Homes**, c/o Leonard G. Feinen, archt., 320 Lincoln Ave., Hasbrouck Heights, N. J. Owner Builds. **$1,200,000.** 32 HOUSES on tract on Barlow Lane, RYE, N. Y.

▲ **Deroe Builders, Inc.**, Rte. 46, Clifton, N. J. Own Forces. **$1,500,000.** 71 HOUSES, Ridge Rd. known as Mountain Gardens, CEDAR GROVE, N. J. Roche & Roche, 234 W. 44 St., New York, N. Y., archts.

▲ **Louis Wachtel**, Mogsten Rd., Mount Fern, Dover, N. J. Owner Builds. **$1,250,000.** 60 HOUSES known as Tall Acre Estates, Mogsten Rd. Mt. Fern, Randolph Twp. DOVER, N. J. Edwin Gerber, 11 Commerce St., Newark, N. J., archt.

▲ **Douglas LaFontaine**, 19 Maple Ave., Rd. No. 1, Somerville, N. J. Own Forces. **$2,500,000.** SHOPPING CENTER, Rte. 206 and New Amwell Rd., Hillsborough Twp., SOMERVILLE, N. J. Tectonic Assoc., U.S. Hy. 206, Somerville, N. J., archts.

▲ **Somerset Country Club Estates**, c/o Jules M. Baron, 135 Broadway, New York, N. Y. Own Forces. **$3,000,000.** 197 HOMES off Rte. 206, SOMERVILLE, N. J. Tectonic Assoc., U. S. Hy. 206, Somerville, N. J., archts.

▲ **Stanley Lynn**, 29-08 31 Ave., Astoria, N. Y. Owner Builds. **$3,000,000.** 160 HOUSE DEVELOPMENT, N. Gaston Ave., SOMERVILLE, N. J. Schulman & Solloway, 100-15 Queens Blvd., Forest Hills, N. Y., archts.

SOUTH

BUILDINGS—BA

▲ **La., Fort Polk**—HOUSING—BA About 8/23—U. S. Eng., Box 1229, Galveston, Tex., construct and finance, 2,000 family housing units (Capehart), ENG-41-243-57-1, Over $15,000,000. CD 4/4.

HEAVY CONSTRUCTION—LB & CA

▲† **Porter-Wagor-Russell, Inc.**, 132 Aragon Ave., Coral Gables, Fla. CA **$1,093,214.** military family housing, Naval Station, NBy 4917, Spec. 4917/56, KEY WEST, FLA. Pub. Wks. Office, 6 Naval Dist., Charleston, S. C. Bids May 29, awarded July 5. CD 6/5, under LB.

▲ **Bradford Builders, Inc.**, 1101 Lincoln Rd. Bldg., Miami Beach, Fla. CA **$1,225,637.** Contr. 1A National Airlines (office bldg.) Part I Miami International Airport, MIAMI, FLA. Bd. Comrs. Dade Co., Court House, Miami, Fla. Bids June 12, awarded July 5. CD 6/19, under LB.

▲† **Breslin Constr. Co.**, 1433 S. Preston St., Louisville, Ky. CA **$1,174,703.** regimental motor park hardstands, paving, sewer, ENG-40-058-56-43, FORT CAMPBELL, KY. U.S. Eng., 360 Federal Bldg., Nashville, Tenn. Bids June 29, awarded July 5. CD 7/6, under LB.

BUILDINGS—LB & CA

▲ **Brice Building Co., Inc.**, 1021 Second Ave. N., Birmingham, Ala. CA **$1,238,718,** est. $1,000,000. women's DORMITORY on new college campus Lakeshore Dr., Homewood, BIRMINGHAM, ALA. Howard College, 7725 Second Ave. S., Birmingham, Ala. Bids June 7, awarded July 11, CD 6/14, under LB;
Daniel Constr. Co., 822 Seventh Ave. S., Birmingham, Ala. CA **$980,924.** men's DORMITORY. (Birmingham, Ala.).

▲ **G. E. Bass & Co.**, Box 1033, Jackson, Miss. CA **$1,545,033.** 2 story, concrete, steel JUNIOR HIGH SCHOOL, Sulphur, LAKE CHARLES, LA. Calcasieu Parish School Bd., Lake Charles, La. Dunn & Quinn, 1735 Ryan St., Lake Charles, La., archts. Bids July 3.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

July 24 Wisconsin

STREETS AND ROADS

July 24 Wisconsin

BUILDINGS—BA

▲ **Wis., Whitefish Bay**—HIGH SCHOOL—BA 7/27—School Dist. 1, 1200 E. Fairmount Ave., Milwaukee, Zone 7, high school addns., alterations, $2,000,000. Plans deposit $50. Grassold-Johnson & Assocs., 734 N. Jefferson St., Milwaukee, Zone 2, archts. CD 5/23.

▲ **Wis., Appleton**—HOSPITAL—BA 8/2—Appleton Memorial Hospital Assn., R. E. Griffiths, administrator, 106 W. Washington St., 100 bed hospital. $1,600,000. Ellerbe & Co., E. 505 First Natl. Bank Bldg., St. Paul, Minn., archts. CD 8/17/54.

▲ **O., Wickliffe**—HIGH SCHOOL—BA 8/7—Bd. Educ., 29240 Euclid Ave., 1 and 2 story, rein.-con., brick facing Senior High School; gymnasium addn.; 2 story academic bldg.; 1 story shop addn. $1,012,000. Plans deposit $35. Outcalt, Guenther & Assoc., 13124 Shaker Square, Cleveland, Zone 20, archts. CD 11/11.

▲ **Ind., Peru**—HOUSING—BA About 8/30—Contg. Office, Bunker Hill Air Force Base, Peru, construct and finance, 680 housing units (Capehart), Bunker Hill Air Force Base. CD 2/9.

HEAVY CONSTRUCTION—LB & CA

▲ **Electrical Constructors, Inc.**, 1758 Cleveland St., Columbus, O., CA **$2,649,574,** est. $3,000,000. 69,000 volt cables for Muny Light Plant, Projects A and D, CLEVELAND, O. City, Div. Light & Power, Vincent M. DeMelto, Comm., City Hall, Cleveland 14, O. Bids June 15, awarded July 5. CD 6/29.

▲ **ILLINOIS**—State Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldg., Springfield,
Ill.—**Arcole Midwest Corp.**, Evanston, Ill. and **S. J. Groves & Sons**, 1100 W. Reynolds St., Springfield, Ill. LB **$1,962,859** (joint bid) (3 bidders) grading test road between LaSalle-Ottawa, LaSalle Co.; LB **$2,025,000** (1 bidder) combined bid test road gradings, separations, LaSalle Co.;
Ill.—**Valley Builders, Inc.**, 400 W. First St., Spring Valley, Ill. LB **$209,189** (2 bidders) four steel I-beam grade separations, test road LaSalle-Ottawa, LaSalle Co. Bids July 6. CD 6/19.

▲ **Standard Paving Co.**, 308 W. Washington St., Chicago, Ill. CA **$1,030,808.** paving Michigan Ave. E. Oak St. to Garfield Blvd., CHICAGO, ILL. City, City Hall, Chicago, Ill. Awarded July 3, CD 6/7/51;
J. A. Ross Co., 3147 N. Cicero St., Chicago, Ill. CA **$106,737.** paving Halsted St. from N. Branch to Grace Sts. (Chicago, Ill.).

▲ **Keeley Bros. Contg. Co.**, 4211 State St., East St. Louis, Ill. LB **$1,250,000.** general constr. **(A)** swimming pool with related imprvs., equip., automobile parking imprvs., sewer, water and gas systems in Jones Park, **(B)** swimming pool, community bldg., equip., sewers, water and gas system in Lincoln Park, EAST ST. LOUIS, ILL. Bd. Park Comrs., East St. Louis Park Dist., 929 Missouri Ave., East St. Louis, Mo. Bids June 26. CD 5/14;
Alvin G. Fields, 624 Missouri Ave., East St. Louis, Ill. LB **$631,529.** heating, plumbing, gas and pool filtration both pools (East St. Louis, Ill.);
Lowry Electric Co., 422 E. Broadway, East St. Louis, Ill. LB **$93,242.** electrical work both pools (East St. Louis, Ill.).

BUILDINGS—LB & CA

▲ **Schirmer-Peterson Co.**, 6830 Beaver Ave., Cleveland 4, O., CA **$4,537,251,** est. $4,471,854. OUTPATIENT BLDG., CLEVELAND, O. City, Dpt. Health & Welfare, Bell Greve, dir., City Hall, Cleveland 14, O. Bids June 14, awarded July 5. CD 6/21, under LB.

▲ **United Engineering & Foundry Co.**, 948 Fort Duquesne Blvd., Pittsbugh 22, Pa., CA Est. **$15,000,000.** SLABBING MILL for Corrigan-McKinney Works, CLEVELAND, O. Republic Steel Corp., 3175 Independence Ave., Cleveland, O.

▲ **H. C. Huber Constr. Co.**, 1631 E. Stroop St., Dayton, O. Owner Builds. **$1,500,000.** 200 brick ranch type HOMES, Heather Hill Addn., Demorest Ave. and Briggs Rd., COLUMBUS, O.

▲ **A. L. Jackson Co.**, 300 W. Washington St., Chicago 6, Ill. CA **$1,750,000.** HIGH SCHOOL, GRADE SCHOOL, AUDITORIUM-GYMNASIUM, ORPHANAGE addn., CHICAGO, ILL. Angel Guardian Orphanage, 2001 W. Devon Ave., Chicago, Ill. Bids July 2, awarded July 6. CD 6/26.

▲ **Trans American Constr. Co.**, 5242 Sheridan Rd., Chicago, Ill. CA **$1,500,000.** MOTEL, 94 and Stoney Island Ave., CHICAGO, ILL. Owner, c/o Frank La Passo, archt., 8 S. Dearborn St., Chicago 3, Ill. Awarded July 3.

▲ **Haman Constr. Co.**, 408 Commercial St., Manitowoc, Wis., LB **$1,497,000,** general constr. West JUNIOR HIGH SCHOOL, GREEN BAY, WIS. Bd. Educ., 523 Howe St., Green Bay, Wis. Bids June 28. CD 5/23. all items.

▲ **Oscar Band Building Co.** 19324 James Couzens Hy., Detroit, Mich. Owner builds. **$1,800,000.** 100 brick ranch HOMES, Warren and Amboy Rds., Dearborn Twp., DEARBORN, MICH.

▲ **Miller-Davis Co.**, 1029 Portage St., Kalamazoo, Mich. LB **$1,678,300.** WAREHOUSE, OFFICE, GARAGE, GRAND RAPIDS, MICH. Kroger Co., 1240 State St., Cincinnati, O. Hixson, Tarter & Assoc., Victory Parkway, Cincinnati, O., archts.

▲ **Kriegholl Co.**, 6661 French St., Detroit, Mich. LB **$2,523,607.** general constr. Chaifonte JUNIOR HIGH SCHOOL, Grosse Pointe Farms, GROSSE POINTE MICH. Bd. Educ., 390 St. Clair Ave., Grosse Pointe 30, Mich. Bids July 2, CD 6/7;
Shaw-Winkler & Hickey, 14855 Ward St., Detroit, Mich. LB **$579,400.** mechanical works (Grosse Pointe, Mich.).

▲ **Practical Home Builders**, 13440 West Seven Mile Rd., Detroit 35, Mich. Owner Builds. **$4,500,000.** Hearthstone Development 240 brick HOMES, Grand River, Middlebelt and West 8 Mile Rd., LIVONIA, MICH.

▲ **Luvisch Building Corp.**, 25323 Plymouth Rd., Detroit 28, Mich. CA Est. **$1,750,000.** Riverbend Estates, 100 brick ranch HOMES, LIVONIA, MICH. Myers-Hill Realty Co., 25249 Plymouth Rd., Detroit 28, Mich.

▲ Sunningdale Homes, Henry S. Alper, 19400 Westmoreland St., Detroit 19, Mich. Owner Builds. **$1,350,000.** 115 brick HOMES Sunningdale Subdivision, NANKIN, MICH.

▲ **David Kay**, 10051 Southfield St., Detroit, Mich. Owner Builds. **$4,000,000.** Land O Lakes development, 300 HOMES, William Lake Rd., WATERFORD, MICH.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

July 24 Iowa, North Dakota

STREETS AND ROADS

July 24 Iowa, North Dakota July 27 Minnesota
August 14 Montana

BUILDINGS—BA

▲ **Iowa, Des Moines**—DORMITORY—BA 7/24—Drake University, 25 and University Sts., dormitory addns. $1,200,000, Eero Saarinen, Bloomfield Hills, Mich., and Brooks-Borg, 815 Hubbell Bldg., Des Moines, archts. CD 7/9.

▲ **Kan., Salina**—HOUSING—BA 7/30—Procurement Office, Smoky Hill Air Force Base, Salina, construct and finance 535 housing units (Capehart), Inv. 14-613-56-112, FHA, 102-81001, $7,000,000. J. R. Cushing, 2005½ Gage St., Topeka, archts. CD 9/1/55, under Airports.

▲ **Colo., Sterling**—HIGH SCHOOL—BA 7/31—School Dist. 12, Sterling, 2 story, 100,000 sq. ft. brick high school. $1,400,000. Atchison & Kloverstrom, 257 Josephine St., Denver, archts.-engrs. CD 11/23.

BUILDINGS—SLC

▲ **Tex., Dallas**—OFFICE—Exchange Park Co., 6419 Maple Ave., soon lets contract 165,000 sq. ft., structural steel, marble and granite exterior office bldg. $4,000,000. Lane, Gamble & Assocs., 2520 W. Mockingbird Lane, archts. Wm. K. Hall, 2501 W. Mockingbird Lane, Dallas, and R. Marvin Shipman, 146 W. Olmos Dr., San Antonio, engrs. CD 7/13/55.

HEAVY CONSTRUCTION—LB & CA

▲ **MINNESOTA**—State Hy. Dpt., 1246 University Ave., St. Paul,

Minn.—**McLean-Astleford Co.**, 7701 Harriet Ave., Minneapolis, Minn. LB **$3,098,714.** (4 bidders) grav. base, concrete base, c. conc., plant-mixed bit. surf., bridges 6.7 mi. Ramsey Co.;

Minn.—**L. M. Feller**, 220½ First Ave. S.W., Rochester, Minn. LB **$150,710** (7 bidders) crushed rock base, road-mixed bit. surf. bridge 0.3 mi. near Austin, Mower Co.;

Minn.—**Brown & Lequil**, Mankato, Minn. LB **$739,270.** (8 bidders) grading 1.5 mi. between Jct. TH 13 and Minnesota River, Dakota Co.;

Minn.—**Anderson & Sons, Inc.**, 100 N. Seventh St., Minneapolis, Minn. LB **$460,791.** (2 bidders) c. conc., plant-mixed bit. surf. 2.1 mi. between Wilshire Blvd. in Crystal and SAR 130, 1 mi. north of Crystal, Hennepin Co.;

Minn.—**Herbison Constr. Co.**, Brainerd, Minn. LB **$92,898.** (3 bidders) grav. base, plant-mixed bit. surf. 0.6 mi. in Aitkin, Aitkin Co.;

Minn.—**Megarry Bros.**, St. Cloud, Minn. LB **$87,032.** (3 bidders) grav. base, plant-mixed bit. surf. 1 mi. bewteen TH 10 and State Reformatory at St. Cloud, Sherburne Co.;

Minn.—**Barton Contg. Co.**, 3115 Hennepin Ave., Minneapolis, Minn. LB **$123,531.** (3 bidders) hot asph. conc. 0.7 mi. in Rochester, Olmsted Co.;

Minn.—**Komatz Constr. Co.**, St. Peter, Minn. LB **$290,398.** (3 bidders) c. conc. base, plant-mixed bit. surf. 1.6 mi. in Luverne, Rock Co.;

Minn.—**Palda & Sons, Inc.**, 462 Dayton St., Duluth, Minn. LB **$655,595.** (4 bidders) c. conc., grav. base hot-asph. conc. surf. 1.6 mi. in Duluth, St. Louis Co. Bids July 6. CD 6/21.

▲† **Kansas City Structural Steel Co.**, 2100 Metropolitan St., Kansas City, Mo. CA **$1,520,683,** est. $1,887,887, Schedule B, State Hy. 13 relocate bridge 1,860 ft., Table Rock Reservoir, CIVENG-03-050-56-44, MISSOURI-ARKANSAS. U. S. Eng., P. O. Box 867, Little Rock, Ark. Bids June 21, awarded July 3. CD 7/3, under LB.

MISSOURI—State Hy. Dpt., Jefferson City,

St. Louis County Bridge & Grading Co., 7929 Alabama St., St. Louis, Mo. CA **$182,753.** three 54 ft. continuous slab spans Sta. 172 plus 68, St. Louis Co. Bids May 24, awarded July 4. CD 6/5, under LB.

▲† **Sharp Bros. Constr. Co.**, 7401 Johnson Dr., Kansas City, Kan. CA **$1,236,591.** 2 story, 36,000 sq. ft. concrete hospital, Grandview Air Force Base, Spec. 56-96, GRANDVIEW, MO. U. S. Eng., 1800 Federal Office Bldg., 911 Walnut St., Kansas City, Mo. Bids June 28. CD 6/21.

▲† **Henry C. Beck Co.**, 1st Natl. Bank Bldg., Dallas, Tex. CA **$3,888,000,** NIKE Facilities, Ellsworth Air Force Base, Inv. 24-066-56-92, RAPID CITY, S. D. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids June 28, awarded June 30. CD 7/3, under LB.

BUILDINGS—LB & CA

▲ **William Matera**, 1200 Basse Rd., San Antonio, Tex. CA **$1,575,000.** HIGH SCHOOL, VICTORIA, TEX. Victoria Independent School Dist., Victoria, Tex. Bids June 19. CD 6/25, under LB.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
August 1 California
STREETS AND ROADS
August 1, 8, 9 California

▲ **Calif., Los Angeles**—BA 8/3—Los Angeles County Flood Control Dist., 2250 Alcazar St., Proj. 46, Lincoln Blvd. and Indiana Ave. storm drain, Santa Monica. $2,000,000. H. E. Hedger, engr. CD 11/7/52.

BUILDINGS—BA

▲ **Ariz., Fort Huachuca**—HOUSING—BA 7/31—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., construct and finance, housing at Army Electronic Proving Ground, ENG-04-353-57-4. $8,000,000.

▲ **Wash., Pullman**—DORMITORIES, etc.—BA 8/31—Washington State College, Pullman, two 5 story reln.-con. womens dormitories; 9 frame apartments. $1,800,000. CD 11/25.

▲ **Ariz., Jacksonville**—HOUSES—BA 9/6—U. S. Eng., P. O. Box 867, Little Rock, construct and finance 1,535 houses, Little Rock Air Force Base. $22,000,000. Plans deposit $100. Wittenberg, Delony & Davidson, Pyramid Bldg., Little Rock, archts. CD 12/30.

HEAVY CONSTRUCTION—LB & CA

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento,

Guy F. Atkinson Co., 10 W. Orange Ave., South San Francisco, Calif., CA **$2,818,146.** constr. 5.1 mi. 4-lane divided freeway on new alignment on U. S. 101 between Santa Rosa and 0.8 mi. south of Wilfred, incl. 5 rein.-con. bridges and concrete box culvert, Sonoma Co. Bids June 13, awarded July 3. CD 6/18, under LB.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles,

Vinnell Co. & Vinnell Constructors, 1145 Westminster Ave., Alhambra, Calif., LB **$4,893,086** (4 bidders) grading, paving 2.6 mi. 8-laned divided freeway on new alignment for Golden State Freeway, Los Angeles and Glendale, and constr. 9 structures, Los Angeles Co. Bids July 6. CD 6/5.

▲† **Gresham Constr. Co.**, P.O. Box 300, Santa Clara, Calif., CA **$1,105,810,** Air Force Communications Station, ENG-56-19, ALMADEN, CALIF. U. S. Eng., 180 New Montgomery St., San Francisco, Calif. CD 7/10, under LB.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles,

W. F. Maxwell Co. 634 S. Western Ave., Los Angeles, Calif., CA **$1,098,618.** grading, surf., widen bridge and constr. 2 bridges, State St. between Long Beach Freeway and Oregon Ave., Long Beach, Los Angeles Co. Bids June 21, awarded July 6. CD 6/27, under LB.

▲† **Matich Bros. and M. M. Sundt & Son**, P.O. Box 390, Colton, Calif., LB **$2,596,077,** est. $2,477,460 (3 bidders) runway primary and facilities, ENG-04-167-56-42, TRAVIS AIR FORCE BASE, CALIF. U. S. Eng., 1209 8 St., Sacramento, Calif. Bids July 10. CD 6/26.

BUILDINGS—LB & CA

▲ **Dahlgren Constr. Co.**, 1700 21 Ave. S., Seattle, Wash., LB **$1,409,833** (4 bidders) general constr. 156,000 sq. ft., steel frame HIGH SCHOOL, EDMONDS, WASH. School Dist. 15, Edmonds, Wash. Bids July 3. CD 6/9.

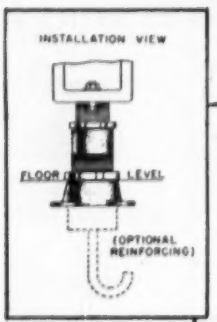
▲ **O'Connor & Cronin**, 9700 Hy. 99, Everett, Wash. Day Labor. $3,000,000. 262 HOUSES, EVERETT, WASH. CD 2/14.

(Continued on page 105)

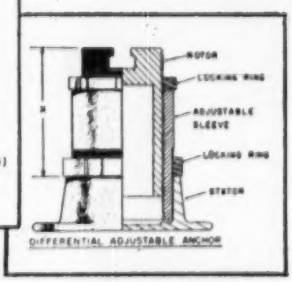
TWO **NEW** *Adjustable*

ANCHORS

TO SLASH CONSTRUCTION AND ANCHORING *COSTS!*



Differential Anchor as installed. The broken line depicts optional use of the 2-B stator which provides additional anchoring qualities.



Vertical adjustment is due to differential in number of threads per inch on outside and inside of sleeve, which enables final adjustment to be made with micrometer accuracy. Horizontal adjustment obtained by rotating tee slot to correctly position bolt. Locking rings eliminate all possibility of movements.

2-B Adjustable anchor utilizing hook bolt for additional anchoring. Cutaway view shows 3 dimensional features (adjustable in any direction) for setting and anchoring equipment. 2-B anchor is also shown at right with component parts removed for clarity. Note substitution of reinforcing steel for hook bolt.

Cost studies prove that LABOR is 95% of the cost of anchoring anything to concrete. Actual practice proves that—"ADJUSTABLE ANCHORS" slash labor costs. No shims for leveling. Adjust horizontally in 2 planes. Can be set surfaced, semi-flushed, flushed or recessed. Can be welded to metal or bolted to wood or metal and still be adjustable three ways! Anchor bolt need not be installed until ready to set equipment —so no anchors protrude from floors, walls — no tripping, no accidents. In tests, a 32,750 lb. pull broke bolt, but did not damage Anchor.

WRITE us today for complete technical data. Let us show you how to cut your anchoring costs by cutting labor costs, speeding up the work, reducing accidents. Write today.

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True, he's physically at the open hearth compounding steel with the sharp eye of an expert. But your Wickwire Distributor makes his call with the full assurance that the steel in Wickwire Rope has the right chemical content and grain size because it's always produced under rigidly controlled conditions by experts.

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4082

A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION

26 YARDS

COBRA QUAD

Highest production 3-axle scraper of them all now joins the Wooldridge complete scraper line

With the low, easy loading scraper performance for which Wooldridge has no equal, this high power, high speed giant offers a capacity for production never before available in this class of equipment. For all of its capacity and ruggedness, the *Cobra Quad* is highly maneuverable, and has incredibly fast getaway with the smooth efficiency of hydraulic coupling drive and the balanced power to handle its full rated capacity of 26 yards heaped – 20 yards struck. It's a proved tool, thoroughly field tested on high production projects... now available to boost your profits. Get all the facts from your Wooldridge Distributor and compare before you buy.

- 300 hp
- 26 cu. yds. heaped
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- Fluid coupling drive
- Air actuated clutch, transmission, and winch
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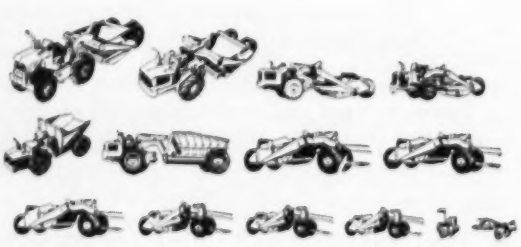
WOOLDRIDGE MANUFACTURING DIVISION

CONTINENTAL COPPER & STEEL INDUSTRIES, INC.
Sunnyvale, California



(Continued from page 102)

▲ **The Austin Co.**, 16112 Euclid St., Cleveland, O., CA Est. $1,500,000. second story 158,000 sq. ft. rein.-con. addn. to MATERIALS HANDLING BLDG., SEATTLE, WASH. Boeing Airplane Co., 7755 E. Marginal Way, Seattle 4, Wash. Harmon, Pray & Detrich, Lloyd Bldg., Seattle, Wash., engrs. CD 3/8.

▲ **Sellen Constr. Co.**, 228 9th Ave. N., Seattle, Wash. LB $1,418,484 (6 bidders) men's RESIDENCE HALL, SEATTLE, WASH. University of Washington, Seattle 5, Wash. Bids July 10. CD 6/18.

▲ **Macdonald Building Co.**, 1517 S. Tacoma Way, Tacoma, Wash., LB $4,544,500 (3 bidders) COUNTY-CITY BLDG., TACOMA, WASH. Pierce Co., Court House, Tacoma, Wash. Bids July 10. CD 5/31.

▲ **Rubino & Gullickson**, 41 S. Wilson Way, Stockton, Calif., CA, $1,262,000. JUNIOR HIGH SCHOOL, PETALUMA, CALIF., Petaluma City Elementary & Petaluma City High School Dist., c/o Supt., 215 Post St., Petaluma, Calif. Awarded July 3. CD 6/27 under LB.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

July 25 Ontario

STREETS AND ROADS

July 25 Ontario July 26 British Columbia

BUILDINGS—BA

▲ **Ont., London**—HIGH SCHOOL—BA 8/17—At office Robert Schoales, archt., 367 Maitland St., 2 story, 60x320 ft. high school for Bd. Educ., E. Harrison, chn., London, Ont. $1,100,000. CD 11/14.

HEAVY CONSTRUCTION—LB & CA

▲ **Dutton-Williams Bros. Ltd.**, Hy. 16, Edmonton, Alta. CA $4,000,000. gas pipe line, Wabamun to Hinton, Fort Saskatchewan area, ALBERTA. North Canadian Oils Ltd., 515 8th Ave. W., Calgary, Alta. Awarded June 15.

▲ **Dominion Bridge Co. Ltd.**, Lachine, Montreal, Que. LB $6,808,075, modification of Jacques Cartier Bridge, Lachine sect. of Seaway, QUEBEC. St. Lawrence Seaway Auth., No. 2 Temporary Bldg., Ottawa, Ont. A. Gordon Murphy, 685 Cathcart St., Montreal, Que., owners ch. engr. CD 9/9/54, under Earthwork, Waterways.

▲ **Canadian Bechtel Ltd.**, 44 King St. W., Toronto, Ont. CA $2,500,000. 100 mi. gas pipe line line from Swift Current eastward, SASKATCHEWAN. Trans-Canada Pipe Lines, Ltd., 505 8th Ave., Calgary, Alta. Awarded June 29. CD 5/29, under Alberta and Ontario.

BUILDINGS—LB & CA

▲ **Dawson & Hall, Ltd.**, 775 Clark Dr., Vancouver, B. C. CA $1,800,000. 5 story 75x120 ft. OFFICE, Granville and Dunsmuir Sts., VANCOUVER, B. C. Imperial Bank of Canada, Dunsmuir and Granville Sts., Vancouver, B. C. Awarded July 7. CD 5/18/55.

▲ **J. L. Guay & Bro. Ltd.**, 6900 Cote des Neiges Rd., Montreal, Que., CA $1,055,953. CITY HALL between Willibrod Park and 1st Ave., VERDUN, QUE. City, City Hall, Verdun, Que. J. Armand Dutrisac, 1069 Beatty Ave., Verdun, Que., archt. Rene Fortin, 3581 Northcliffe Ave., Montreal, Que., engr. Bids June 18, awarded July 5.

ALASKA

HEAVY CONSTRUCTION—LB & CA

▲† **ALASKA**—Alaska Road Comn., Dpt. Interior, Box 1961, Juneau,
M-B Contg. Co., Lloyd Bldg., Seattle, Wash., CA $1,302,144, est. $1,348,153, bit. surf. 29.28 mi. Sterling Hy. Bids June 26. CD 6/29, under LB.

LATIN AMERICA

HEAVY CONSTRUCTION—BA

▲ **Venezuela**—TUNNEL—BA 8/15—Ministry of P. Wks., Edif. La Previsor, Caracas, D. F., 3,390 ft. tunnel under Lake Maracaibo outlet to Caribbean between Punta Piedras and Punta Iguana. A lift bridge will cross the channel. $45,000,000.

▲ **Paraguay, Asuncion**—BA 10/1—Corposana, Asuncion, Paraguay, Constr. 1, general constr.; Contr. 2, furnishing treatment plant equip.; Contr. 3, furnishing pump equip.; Contr. 4, furnishing materials for electrical transmission lines; Contr. 5, furnishing pipe and misc. items for water supply sys. Radar Engineering Co., 111 N.E. 2nd Ave., Miami 32, Fla., U. S. A., engr. CD 6/19.

AMERICANS ABROAD

▲ **Foster-Wheeler Corp.**, 165 Broadway, New York, N. Y., U.S.A. CA Est. $1,400,000. design and construct pool type reactor for nuclear research, ROSKILDE, DENMARK, Danish Atomic Energy Comn., Copenhagen, Denmark.

▲ **American Car & Foundry Co.**, 30 Church St., New York 8, N. Y., U.S.A. CA Est. $2,000,000-$3,000,000. design and construct modified pool type reactor for nuclear research, NETHERLANDS. Netherlands Reactor Center, c/o Netherlands Govt., The Hague, Netherlands.

(Proposal Advertisement see pp. 116 to 119)

SPEED UP THESE TOUGH JOBS

Ingersoll-Rand GR-125 Gyro-Flo Compressor, Continental-powered, operating Mall chain saw cutting 12" x 12" timber to repair pier. Equipment in use on an eastern railroad.

WITH CONTINENTAL RED SEAL POWER

Year after year, ever since 1902, Continental engines have been proving their dependability in a steadily-lengthening list of special-purpose machines. Today, no matter what the exact requirement of the job, there's a Red Seal model—gasoline, Diesel, or LPG—engineered and built to meet it down to the last detail—a model with the proper performance characteristics, profile, shape and weight. In the industrial line there are models at closely-spaced levels—from 14 to 240 horsepower. You find them on an almost endless number of operations, speeding the tough jobs and delivering their full work quota, day in and day out, with a minimum of time out for adjustment or repairs.

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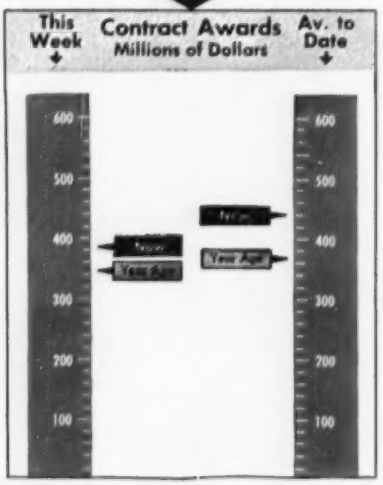
Construction Scoreboard

Activity this Week



AMOUNT OF CONTRACTS LET

By Ownership	This Week	Cum. 29 wks 1956	Chge %
	$ millions		
Federal	$36.0	$1,065.6	−2
State and Municipal	121.0	3,679.6	+25
Total Public	157.0	4,745.1	+18
Total Private	234.3	8,056.6	+20
U. S. Total	$391.3	$12,801.8	+19
By Type of Work			
Waterworks	$4.5	$211.3	+43
Sewerage	8.3	338.3	+54
Bridges	6.6	350.8	+34
Highways	56.1	1,349.5	+13
Earthwork, Waterways	6.6	463.2	+48
Buildings:			
Public, Excl. Hosp.	44.5	1,119.5	+14
Public Housing	1.0	245.0	+50
Private Housing	120.5	3,285.4	−12
Commercial	28.7	1,042.3	+3
Industrial	76.7	3,334.0	+117
Unclassified	37.8	1,062.5	−12
U. S. Total	$391.3	$12,801.8	+19

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

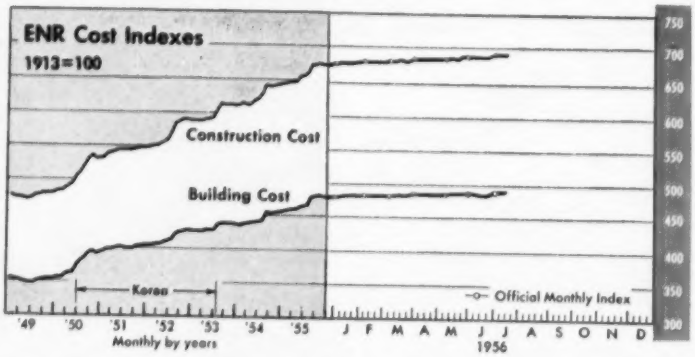
NEW CAPITAL FOR CONSTRUCTION

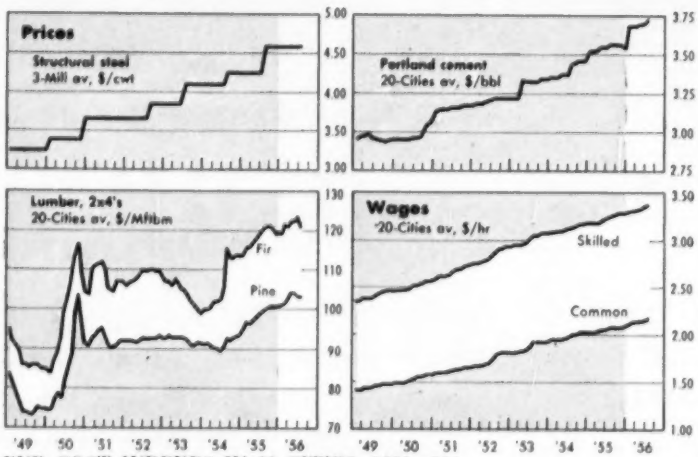
	Week of July 12	Cum. 28 wks 1956	Chge '55-'56 %
	$ millions		
Corporate Securities	$76.2	$2,377.6	+24
State and Municipal:			
All Except Housing	23.3	2,635.2	+11
Housing	1.0	42.3	−33
Federal Loans	...	78.5	0
Federal Aid	165.0	1,070.0	+44
Total Nonfederal	$265.6	$6,203.6	+20
Federal Appropriations:			
In U. S.	$178.0	$1,102.0	+142
Outside U. S.	2.0	14.9	−64
Total New Capital	$445.6	$7,320.5	+29

Cost Indexes as of Now

ENR INDEXES (1913=100), 20-cities' average	Week of July 12, 1956	% Change from June 14, 1956	% Change from July 14, 1955
Construction Cost	.....	.....	.....
Building Cost	.....	.....	.....

To convert above indexes to 1926=100: Divide Construction Cost by 2.030; Building Cost by 1.845.
1949=100: Divide Construction Cost by 4.770; Building Cost by 3.518.





ENR COST INDEXES IN 22 CITIES, 1913=100

City	Construction Cost July 1956	Construction Cost % Change in Month	Construction Cost % Change in Year	Building Cost July 1956	Building Cost % Change in Month	Building Cost % Change in Year
Atlanta	502	0	+6.2	424	0	+5.7
Baltimore	595	0	+2.4	491	0	+7.4
Birmingham	549	0	+7.6	448	+0.4	+5.9
Boston	743	−0.1	+6.7	502	−0.2	+5.8
Chicago	786	−0.2	+5.9	502	+0.2	+5.0
Cincinnati	707	+4.1	+6.6	479	+0.8	+4.6
Cleveland	819	+1.2	+5.5	508	0	+5.8
Dallas	524	+3.0	+5.3	431	+1.7	+6.3
Denver	670	0	+3.6	491	+0.6	+3.2
Detroit	800	0	+4.3	518	+0.9	+5.0
Kansas City	712	+0.1	+3.7	499	+0.1	+4.2
Los Angeles	730	−0.4	+4.8	488	−0.6	+3.6
Minneapolis	747	+0.1	+5.1	516	+0.1	+4.6
New Orleans	560	−0.8	+4.3	452	−1.0	+2.6
New York	838	+2.4	+11.8	565	+1.6	+5.9
Philadelphia	737	0	+3.5	538	0	+2.6
Pittsburgh	685	−0.4	+2.0	500	+0.03	+2.7
St. Louis	754	−0.2	+4.4	521	−0.3	+4.7
San Francisco	718	−1.0	+5.7	470	−1.6	+3.5
Seattle	716	−0.5	+4.8	440	−0.7	+3.9
U. S.-20 Cities' avg.	695	+0.4	+5.3	489	+0.1	+4.6
Montreal	560	0	+6.7	437	0	+7.9
Toronto	597	+3.7	+8.5	467	+0.9	+4.4

For ENR cost indexes for preceding years see insert chart ENR Sept. 29, '55. Extra copies 50 cents.

Noble-Mobile batching plant on wheels

Noble-Mobile at site of new Crown-Zellerbach plant, Antioch, Calif. 10" wheels dismounted for use on truck mixers. Supplier: H.W. "Heine" Gentry Co., Walnut Creek, Calif.

gets job 21 miles from base and makes it pay...batches at job site with Noble-Mobile

Hauled along highway like semi-trailer • Set up in one day—no field wiring, footings or crane time required on base plant • Aggregates charged with front end loader, crane or conveyor • Bulk cement utilized ...batched automatically • Excellent quality control Maximum production from mixer trucks—short hauls, more yards per day • Production capacity 60 to 100 yards per hour • Covered by patents pending

NOBLE BATCHING PLANTS

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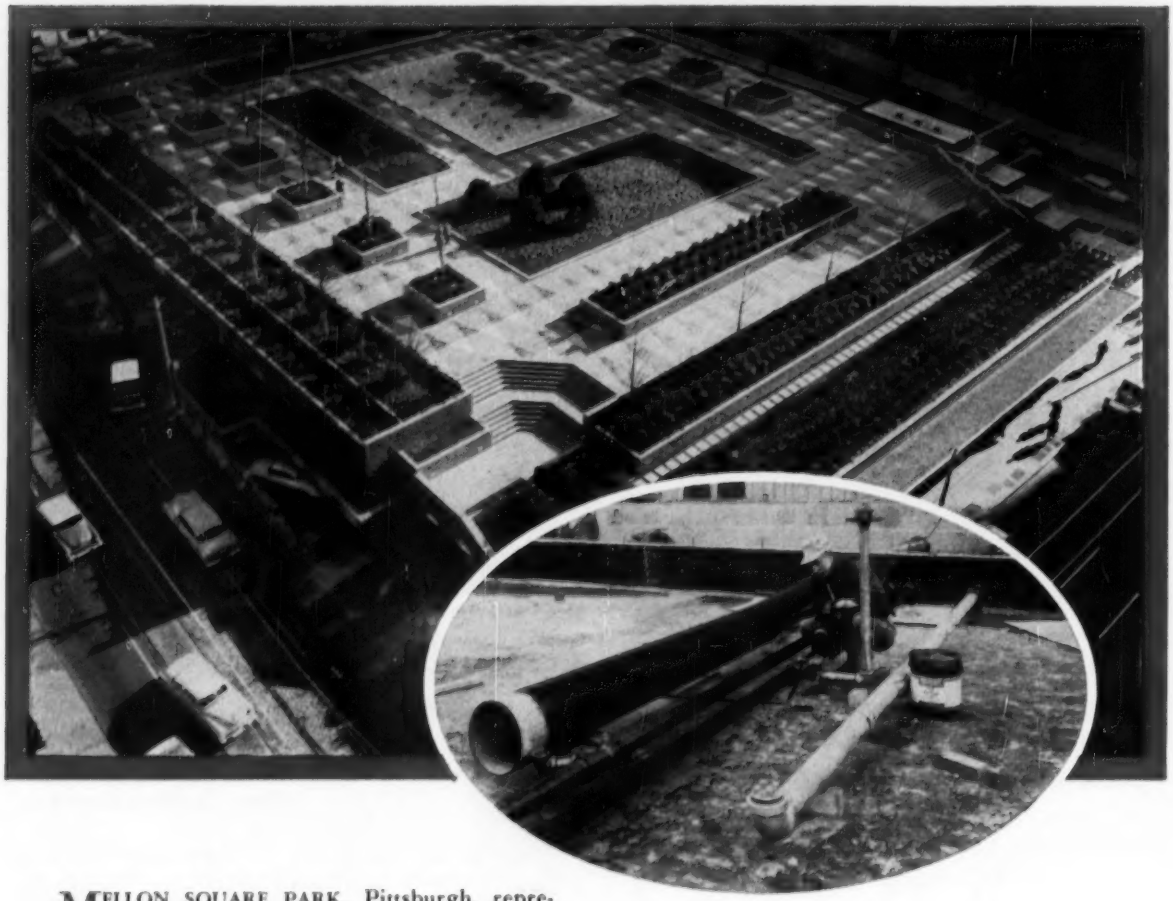
PITT CHEM COATINGS SAFEGUARD VITAL UNITS OF UNIQUE GARAGE-PARK



MELLON SQUARE PARK, Pittsburgh, represents a unique achievement in modern city planning. The top level is a beautiful park with sparkling fountains, cascading pools and more than 25,000 specimen trees, shrubs and flowers. Beneath is one street level and five underground levels to provide parking for thousands of busy shoppers and workers.

Protecting vital structural units of the park against moisture and other types of corrosion called for a long-lasting, heavy-duty protective coating. That's why *Pitt Chem Coal Tar Coatings* were selected for corrosion trouble-spots such as the water mains and flood light standards.

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Canada Zooms to Construction Record

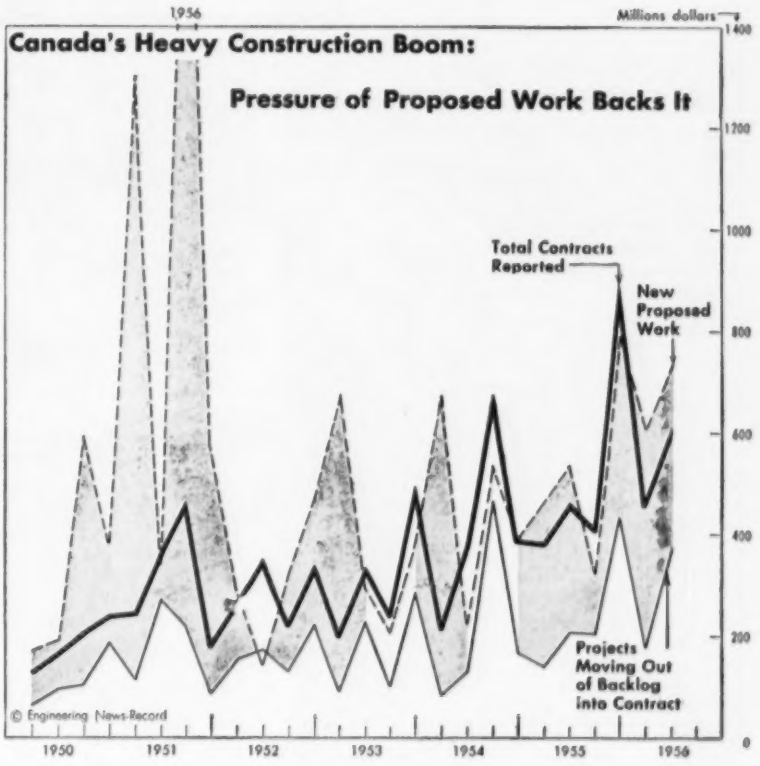
The once forbidding Northland is turning into a land of opportunity for contractors—Canada today is enjoying the biggest construction boom in its history.

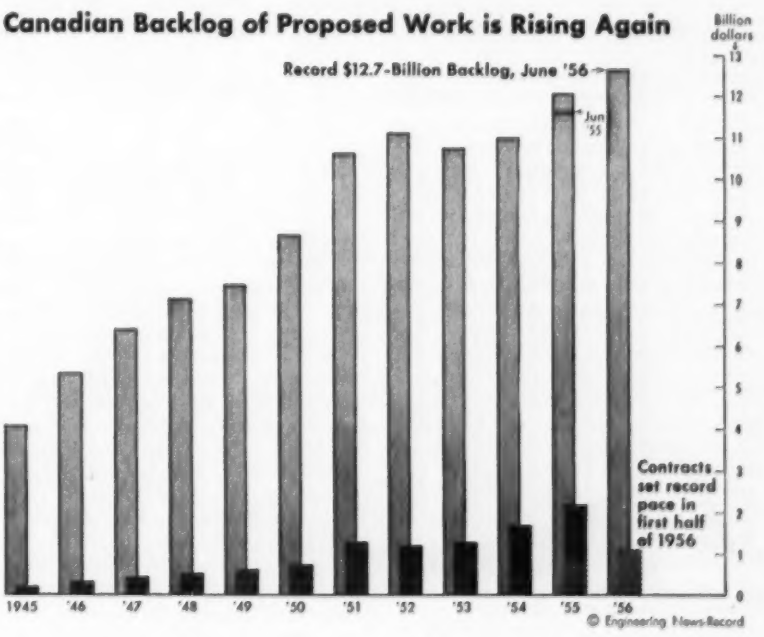
Canadian contract awards for heavy construction totaled $1 billion in the first six months, 27% ahead of the same period last year. The total for the year could easily hit a new high of close to $2.5 billion.

Private construction is roaring along at a rate 45% ahead of 1955. Nearly $300 million worth of industrial plant projects were signed up by contractors in the first six months, more than double the 1955 figure.

A rash of paper plants, uranium and iron ore developments, chemical plants and asbestos mills testify to the feverish activity of Canada's new era of industrial development. Backing up this hectic contract activity is a fast-swelling backlog of proposed industrial projects. This backlog now totals $2.4 billion, up 22% in the past year. Typical of the U. S. firms that are sparking Canadian industrial development is Scott Paper Co. which announced plans in June for a $35-million paper mill in Nova Scotia.

U. S. firms are active in building branch plants, too, and U. S. investors have financed a major part of the Canadian boom. This trend seems likely to continue even though some Canadians have voiced resentment over the large number of industries controlled by U. S. dollars.





• **$1-billion pipeline**—The bitterest opposition on this score developed over what is now Canada's biggest single construction project—a $1-billion trans-Canada pipeline designed to carry natural gas more than 2,000 mi from Alberta to the more heavily populated eastern provinces.

After months of political controversy, the Canadian government agreed to finance one "economic" section of the line across the desolate prairie country. And, with this missing link supplied, contracts have begun to flow for the balance of the huge project. In the last six weeks, nearly $100 million worth of contracts have been awarded for this pipeline alone. This has accounted for the astronomical increase in private unclassified work.

Commercial building, which includes residential, office buildings, and shopping centers, is off a sharp 25%

in Canada at the half-year mark. But, there's a big backlog of work accumulating. The commercial building backlog has reached $2.6 billion, up 23% over a year ago. It has the biggest volume of proposed work of all Canadian construction.

• **More roads planned**—Another large backlog of proposed work has developed for highways. This reflects the Canadian decision to open up its vast territories with a network of improved highways. This backlog of road work now totals $1.3 billion.

Contracts for road work added up to more than $73 million in the first half, up a whopping 47% over 1955.

The largest backlog for public work is for buildings, with a total of $1.7 billion. This category has biggest volume of contracts, $128 million, but this is down 21% from last year.

Although the dollar volume of waterworks and sewerage construction is small in Canada, it is growing fast. Contracts are currently running at double the 1955 rate. Further growth can be expected because of the rapid rise in population. New waterworks proposed in the first six months of 1956 topped $16 million (as against less than $6 million last year), while sewerage projects in the planning stage totaled $28 million, as against $17 million in 1955.

• **How long will it last?**—Watching the meteoric rise in Canadian construction activity, the question arises: "When will it end?"

There's no obvious answer. It depends on the general behavior of the U. S. economy (because the Canadian boom is relying heavily on U. S. private investment funds), on how fast Canada can build up its population through its current immigration drive, and the success in developing Canada's fabulous natural resources.

For the short term, Canada's construction picture is clouded by two factors—the shortage of structural steel and the shortage of labor (both skilled and unskilled). Roughly 25% of the steel Canada uses in construction comes from the United States. So, the U. S. steel strike can have a real effect on Canadian projects. European steel imports have made only negligible contributions to the Canadian steel supply, and the steel that is brought in from Europe at a time like this commands gray market prices.

The labor shortage is being relieved slightly by immigration, which Canada is strongly encouraging. If Canada can get the manpower it needs, its future looks bright indeed.

Work Put-in-Place Sets Record

Construction expenditures for work put-in-place set a new six months' record of $19.9 billion, 2% above the previous high set last year, the Commerce and Labor Departments reported last week.

June outlays also set a record for the month with almost all types of construction sharing in an 8% rise over May.

All-time records for any month were set by private industrial building, public utilities, sewer and water facilities, while new highs for the month of June were posted for highways, commercial building and schools.

• **Public works up**—A surge in public works activity carried this type of work to a new monthly record of $1.3 billion. It more than compensated for a slight drop in the total of private work.

Private construction last month totaled $2.7 billion, off slightly from the June 1955 total, which was dragged down by a 12% dip in private residential construction.

Private housing outlays for the first six months trailed the comparable 1955 period by 8%, according to the government estimates. The comparison is based on totals of new dwelling units and additions and alterations.

When new housing units are considered alone, dollar outlays for private housing for this year lag 10% behind 1955.

• **Plant expenditures soar**—Private industrial building apparently has not been hampered by tight money. Outlays for private industrial building put-in-place total $1.4 billion for the first six months of this year. That's 27% ahead of the same period in 1955. The industrial building boom is still gathering steam. Expenditures last month were up 4% over May and were 35% ahead of June 1955.

Other private non-residential building also is running well ahead of last year. The six-month total for offices and warehouses is $607 million, 18% over the comparable 1955 period, while stores, restaurants and garages, with a total of $961 million, top the first six months period of last year by 21%.

Public utility construction (a big category) ran up $2.3 billion in work put-in-place during the first half, 10% higher than the total for the same period in 1955, when this type of construction was enjoying one of the best years on record.

• **Highways pace public works**—With $2 billion in expenditures for the first six months, highways are leading the public works boom. Construction outlays for roads are 15% ahead of the first half of 1955.

School construction is topping 1955 by 3% at the half-year mark, with outlays of more than $1.2 billion. And, construction expenditures for sewer and water facilities total $577 million for the first six months, 13% ahead of last year.

Business Briefs . . .

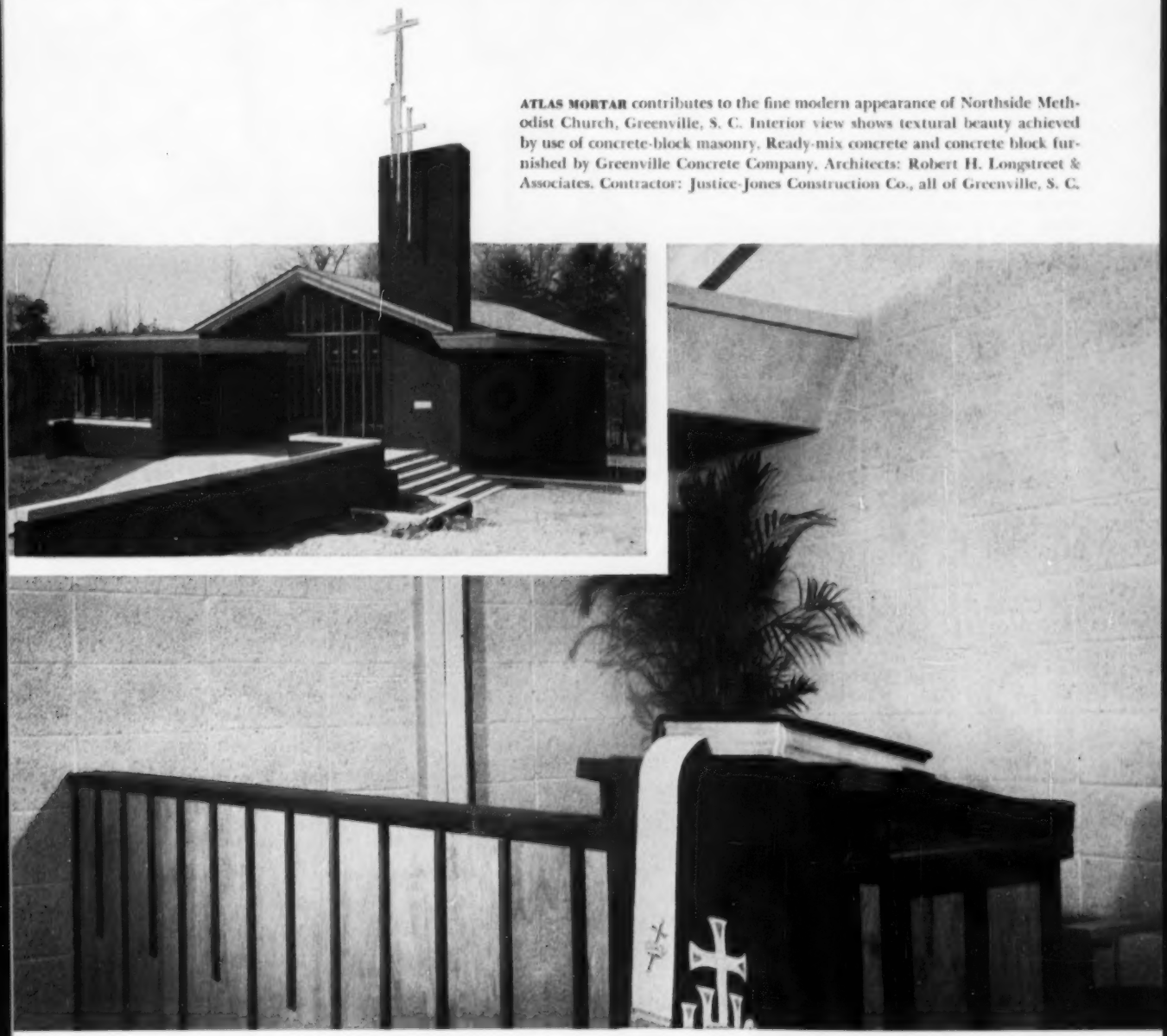
• **Copper price cut**—After a succession of price increases which drove the price of copper to 46 cents a pound, the Big Three U. S. producers last week chopped the price of the metal six cents a pound, thereby reflecting a three-month softening found in the world market.

• **Speed bond action**—A validation hearing for $185 million in revenue bonds, to finance the northern section of the Sunshine State Parkway, was slated to be held this week by the Florida Supreme Court. The hearing comes nearly two months earlier than originally expected. If the court approves the bonds, construction will start within 90 days.

• **Turnpike issues delayed**—Sale of two turnpike bond issues has been postponed indefinitely because of the weakened condition existing in the tax-exempt bond market. Affected by mounting inventories of unsold bonds in dealers' hands, authorities delayed marketing of a $25-million issue for New Jersey's Garden State Parkway and a $50-million issue of New York State Thruway bonds.

• **Expensive borrowing**—To finance a mammoth construction program, American Telephone & Telegraph last week sold $250 million worth of 34-year, 3⅞% bonds at an effective interest rate of 3.76%. It was the highest price AT&T has had to pay for money since 1930 (when it paid 5%). Successful bidder for the AT&T issue was a 242-member combine headed by Halsey, Stuart & Co. and First Boston Corp.

• **Tighter mortgage market**—Discounting of FHA-insured mortgages, continued in June, according to FHA Commissioner Mason. Discounts averaged $2.40 per $100 for loan value.



ATLAS MORTAR contributes to the fine modern appearance of Northside Methodist Church, Greenville, S. C. Interior view shows textural beauty achieved by use of concrete-block masonry. Ready-mix concrete and concrete block furnished by Greenville Concrete Company. Architects: Robert H. Longstreet & Associates. Contractor: Justice-Jones Construction Co., all of Greenville, S. C.

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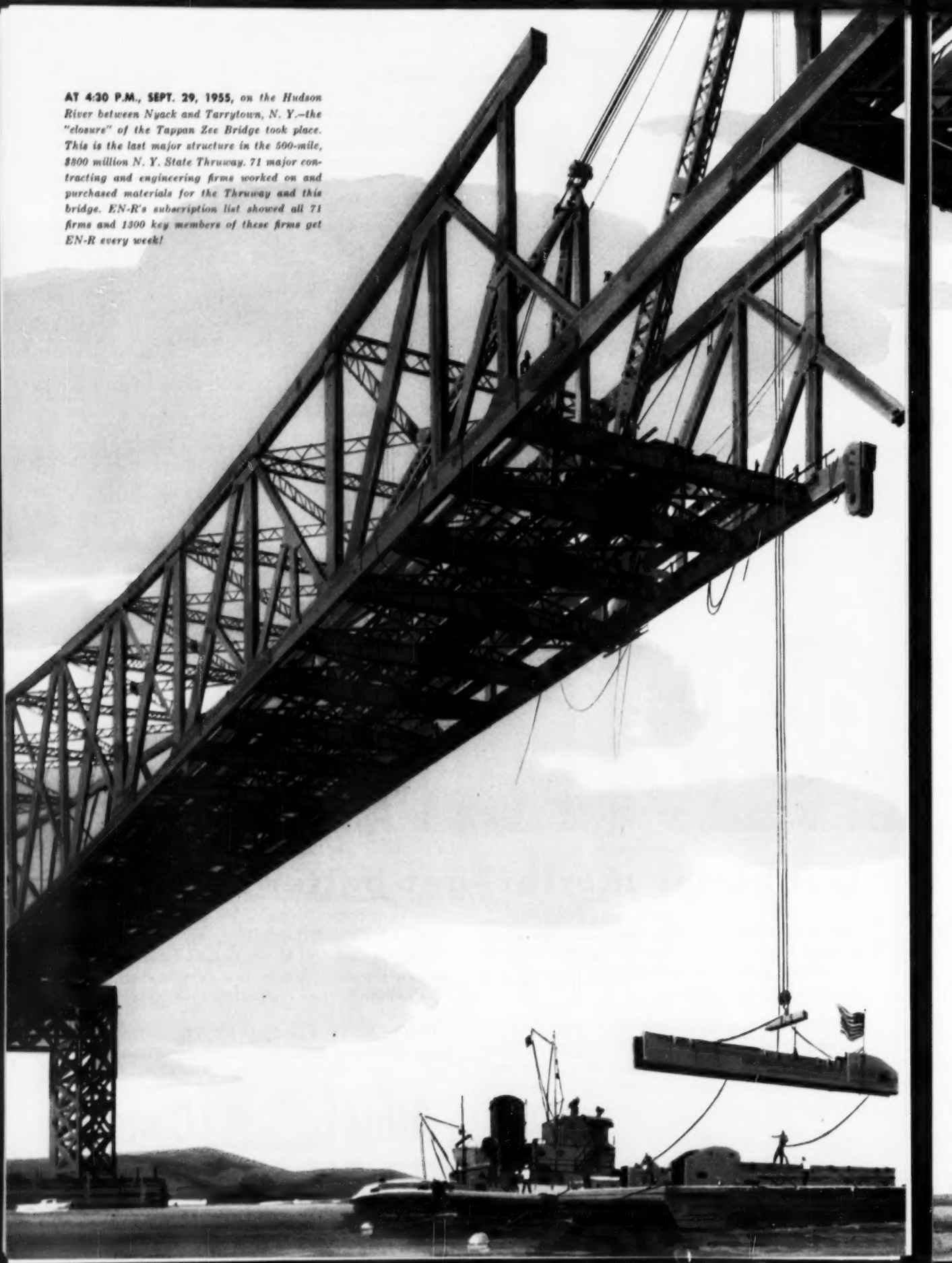
UNITED STATES STEEL HOUR—Televised alternate Wednesdays — See your newspaper for time and station.



AT 4:30 P.M., SEPT. 29, 1955, *on the Hudson River between Nyack and Tarrytown, N. Y.—the "closure" of the Tappan Zee Bridge took place. This is the last major structure in the 500-mile, $800 million N. Y. State Thruway. 71 major contracting and engineering firms worked on and purchased materials for the Thruway and this bridge. EN-R's subscription list showed all 71 firms and 1300 key members of these firms get EN-R every week!*

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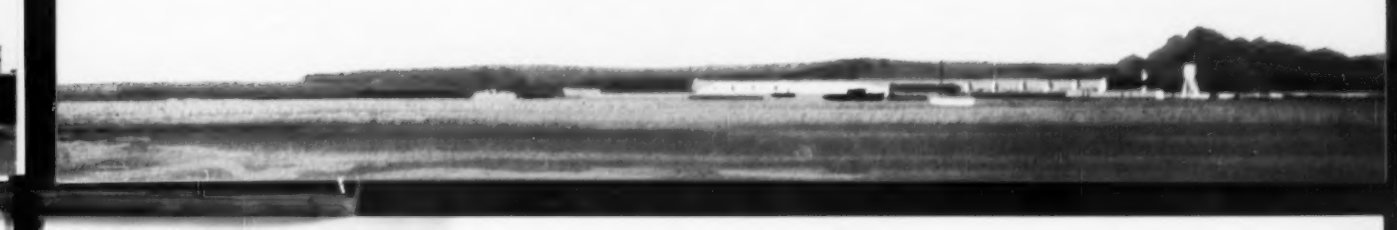

THE LONGER LOOK:

Collective bargaining on a wider geographical scale is on the upswing with western areas establishing the pattern

Contractors throughout the country can look for a trend toward collective bargaining on a wider geographical scale than individual cities and metropolitan areas. Bargaining on a regional basis already has taken a foothold in the Pacific Northwest and on the West Coast, and some crafts have instituted regional bargaining elsewhere.

If the movement toward wider bargaining areas continues, it is likely to have important consequences for the construction industry. These consequences and an account of the development of regional bargaining in the Pacific Northwest are the subject of an article by Kenneth M. McCaffree, assistant professor of economics at the University of Washington in the July issue of the INDUSTRIAL AND LABOR RELATIONS REVIEW.

• **The trend**—In the past ten years, according to Prof. McCaffree, agreements of every major craft in the Pacific Northwest have shifted from local coverage (city or metropolitan area) to area coverage (two or more large cities). And most unions have demanded regional agreements.

The carpenters are cited as typical. The 1948 agreement between the Spokane Chapter of the Associated General Contractors and the carpenters was confined to Spokane County. By 1951, the agreement covered 13 local unions in the eastern half of Washington and the northern half of Idaho. By 1952 a parallel development had brought all of western Washington under a single agreement. Then in 1954 the eastern Washington carpenters struck, unsuccessfully offering to settle for a uniform statewide agreement. But the agreement signed was closer than ever before to the western Washington contract.

Elsewhere in the nation, McCaffree lists concerted efforts to obtain multi-area or regional agreements by the boilermakers, teamsters, electrical workers, ironworkers and plumbers with still others having statewide agreements. In the Pacific Northwest and on the West Coast, McCaffree estimates, "well over half of the construction work is now done in accordance with area or regional labor contracts."

• **The reasons**—The explanation for expansion of bargaining areas, McCaffree suggests, lies in five factors:

• **Dispersion of population and union membership.** Unions with small and widely scattered membership tend to organize larger geographical jurisdictions for local unions than more concentrated crafts. It is easier also for a small number of unions to set up an area of regional agreement. The boilermakers have only 13 construction locals under their Seven Western States Agreement.

• **Contractor mobility and market competition.** Improved highways and transportation facilities, mobile equipment and more equipment-rental firms have enabled contractors to bid for jobs in wider areas. The bargaining area tends to widen with the employer's market area. The fact that contractors usually must pay their cadre crews on the scales of their own locals even when working in lower-wage areas helps, too.

• **Government construction.** The Pacific Northwest has experienced several mammoth government projects—Columbia Basin Irrigation Project, Hanford Atomic Energy Project, several Columbia River dams. These required bringing together workers from wide areas with varying local wage rates and working conditions who demanded equal pay and became advocates of uniformity. Davis-Bacon requirements of "prevailing" wage rates on large projects are another force that promotes area uniformity in union contracts. And large highway and bridge projects carry much of the heavy construction work far beyond the jurisdiction of local unions.

• **Enhanced bargaining power.** Union strength seems to grow, relative to contractors, when the bargaining area is widened. The unions can impose greater discipline and prevent their "weak sisters" from setting low standards. Also, they can employ more effective negotiators when they combine. Generally contractor associations have proved too loose and undisciplined to meet this challenge.

• **Convenience.** Only one contract must be negotiated and enforced rather than several, saving time and resources and reducing confusion. Also, having only one contract makes it easier for workers to move to jobs in other jurisdictions.

Another factor, not mentioned by McCaffree, that seems certain to further the trend toward regional agreements is the growth of pension, welfare and other fringe benefit plans. With workers shifting from job to job within wide areas, as they do in construction, many building trades unions see the only solution in agreements on benefit plans covering all workers of a craft in a broad geographical area. This could easily lead to regional bargaining on wages as well.

• **Some advantages**—There are some advantages for contractors in regional bargaining. Convenience and stabilization are probably the strongest. Contractors bidding on jobs outside narrow local areas will not have to acquaint themselves with a Pandora's box of local contract provisions.

Another advantage is protection against "whipsawing." McCaffree cites the instance of 1955 ironworker negotiations in Oregon and western Washington. Seattle contractors agreed to a 10-cent health-and-welfare allowance in earlier negotiations, but Oregon contractors refused. Instead, they granted a substantial travel allowance. So in 1955 the Oregon ironworkers used the Washington health-and-welfare allowance as a basis for a similar demand, and the Washington ironworkers made the same use of the Oregon travel allowance. The contractor associations conceded both conditions in both areas, but many members argued that a unified front would have enabled them to be firmer in resisting the demands.

Regional bargaining accomplishes a long-standing union objective by "taking wages out of competition." This makes contractor success within the area entirely dependent on operating efficiency relative to competitors. But it works a hardship, McCaffree suggests, on small and undeveloped communities. Travel allowances on top of high wage rates could make jobs in isolated areas very unattractive.

One result that seems sure to come from regional agreements is more formal, higher powered and more detailed negotiating. This means a more profesisonal job of collective bargaining on the union side. And contractors will probably have to place more reliance on collective efforts if they expect to hold their own.

(*Labor continued on page 115*)

NLRB Skirts the Joint Board

Assignment of disputed work by contractor not bound by jurisdictional peace plan allows the NLRB to step in

The National Labor Relations Board has again ruled it has authority to settle a jurisdictional dispute—this time between carpenters and roofers—where the disputed work assignment is made by a subcontractor who isn't subject to the settlement procedures of the National Joint Board for the Settlement of Jurisdictional Disputes. The fact that the unions involved, as well as the general contractors, are subject to the Joint Board procedure is not controlling. Nor is the fact that the Joint Board had previously issued two decisions on the same dispute.

In discussing the merits of the case, which arose in California, the NLRB tabbed as an unfair labor practice attempts of the carpenters to have the installation of composition shingle roofs in San Mateo County, Calif. assigned to them instead of to roofers. In the absence of any contractual or judicial requirements to the contrary, the NLRB said, the roofing subcontractors were free to assign the disputed work to whomever they pleased.

The dispute had gone to the Joint Board on several occasions. Two decisions were rendered in favor of the roofers. In the other cases no decisions were made. In one of these instances, the Joint Board took the position that there was "no continuing dispute" on the job and hence no need for a decision—because the carpenters had meanwhile achieved their goal by forcing the contractor to change to wooden shingles traditionally laid by carpenters. Yet the dispute continued at the expense of both the roofers and roofing subcontractors, despite the fact that the carpenters and the general contractors were contractually—but voluntarily—bound to abide by Joint Board determinations.

Before it could consider the merits of the case, the board first had to dispose of a procedural question embracing significant sidelights on Section 10 (k) of the Taft-Hartley Act, under which the case was handled.

Formal notice of the NLRB proceeding had not been served on the contractors who made the disputed work assignments. Conceding they were necessarily parties to the dispute, the board nevertheless ruled that failure of notice was not a fatal error—because the employers had had actual notice, appeared as witnesses and could have intervened.

In his dissent, however, member Abe Murdock said the board's approach "fails to recognize the board's function as an arbitrator in a 10 (k) proceeding." (Under that section, when an unfair labor practice charge has been filed relating to a dispute over work assignments, the board can enter the picture after "first affording the labor organizations involved in the dispute a reasonable opportunity to settle their controversy between or among themselves.")

Murdock took the position that failure to make the employers parties to the proceeding precluded any real opportunity of reaching a voluntary settlement which the law seeks to encourage. "An employer, not a party to the proceeding," he noted, "would have no incentive to participate in discussions for . . . voluntary adjustment of the dispute, nor would the unions . . . be certain that any voluntary settlement of the dispute they may agree upon would be acceptable to the employer and be honored by him."

Use of Apprentices

Labor Department outlines Davis-Bacon requirements

The Solicitor's Office of the U. S. Department of Labor has prepared a memorandum covering enforcement policies affecting employment of apprentices on federal and federally-assisted construction to which the Davis-Bacon Act wage provisions apply.

Now made available by the Bureau of Apprenticeship, the memorandum outlines existing regulations with which contractors must comply. These cover the necessity of registration, the procedure and time elements involved in registration, credit for past experience, ratios of apprentices to journeymen, wage determinations and compliance investigations.

The memorandum is being circulated by the Bureau of Apprenticeship because of the large amount of federally-assisted construction work both under way and proposed. It is based on the Secretary of Labor's Regulations, Part 5, issued under Reorganization Plan No. 14 of 1950. Those regulations are generally considered applicable to construction on the interstate phase of the federal highway system under the new Federal-Aid Highway Act of 1956, although Section 115 of the law does not explicitly cover the point.

Basic requirement for using apprentices on jobs covered by the Davis-Bacon Act is that apprentices can work only under a bona fide apprenticeship program registered with a recognized State Apprenticeship Council or, if none, with the federal Bureau of Apprenticeship. Wages for apprentices must be officially determined and periodic investigations are made to determine compliance with the wage provisions, including correctness of work assignments and the proportion of apprentices used to journeymen.

Copies of the circular entitled, "Employment of Apprentices on Federal or Federally Assisted Construction Projects," may be obtained from the Bureau of Apprenticeship, U. S. Department of Labor, Washington 25, D. C.

Building Trades Protest The Use of Prison Labor

Eight of the building trades working on construction of a $7-million prison at Ionia, Mich., left their jobs in protest against use of prison labor.

Following the walkout, the issue was headed for a showdown in the state legislature, where the House had approved an appropriation to cover the exclusive use of union labor. The Senate balked at the move. Said one senator: "We are never going to write union labor rights into a state appropriations bill."

Prison officials said they did not expect to build a prison with inmate labor "since most of them do not possess skills necessary for modern construction" but suggested prisoners could do "finishing up work, such as painting and other work."

Labor Briefs . . .

• **Workmen's compensation**—An annual reduction of $5 million in Pennsylvania workmen's compensation rates becomes effective next month, amounting to an average reduction of 8½% for employers generally and 11.2% for those engaged in construction and quarrying.

• **Mergers**—With some objections from the teamsters, Iowa has completed its AFL-CIO merger on the state level, following similar action in Oregon and Wyoming. Other states that have merged are: Arizona, Arkansas, Colorado, Louisiana, Missouri, Montana, Tennessee, Vermont and Virginia.

OFFICIAL PROPOSALS

Bids: July 26, 1956

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A. M., advanced standard time, which is nine-thirty o'clock A. M., eastern standard time, on the 26th day of July 1956, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 2, Lacy Ketchum, District Engineer, 109 No. Genesee St., Utica, N. Y.						
Fulton (Rte. 148)	FARC 56-52	Gloversville-Mayfield, S.H. 33 Project U-F-419(7)	2.43	Asp. Conc.; Opt.	$23,000 Plans $15	$416,000
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, 65 Court St., Buffalo, N. Y.						
Niagara Rte. 31)	FATC 56-2	City of Lockport: Genesee St. & Walnut St. FAC 52-11, FAC 54-10 Project U-709(6)	1.21	Traffic Signal System	$2,200 Plans $10	41,000
DISTRICT No. 6, J. H. Thomas, District Engineer, 30 W. Main St., Hornell, N. Y.						
Steuben (Rte. 15)	FARC 56-49	Painted Post–Campbell, S.H. 5211 Campbell–Bath, S.H. 5224 Project F-225(10)	4.30	Asp. Conc.; Opt.	$20,000 Plans $10	363,000
Steuben (Rte. 36)	FARC 56-50	Arkport–Dansville, S.H. 5352-B & 5352 Project F-579(4)	3.41	Asp. Conc., Opt.	$12,000 Plans $10	225,000
Steuben (Rte. 17 & 36)	FARC 56-51	Troupsburg Center–Jasper, Pt. 2, S.H. 8154 Canisteo–Jasper, S.H. 5348-B and Jasper–Addison, S.H. 5253E Project F-442(6); F-1115(1)	3.15	Asp. Conc.; Opt.	$12,000 Plans $10	203,000
DISTRICT No. 7, R. W. Sweet, District Engineer, 444 Van Duzee St., Watertown, N. Y.						
St. Lawrence (Rte. 37)	FATC 56-1	Massena South Side Route, Pt. 1, FASH 56-13 (37-2-27) Massena South Side Route, Pt. 2, FASH 55-7 Massena–Helena, Pt. 1, S.H. 1261 Project U-580(11)	5.13	Traffic Signal System	$3,500 Plans $10	64,000
St. Lawrence (Rte. 37B)	FASSH 56-4	Village of Massena: Center St.–Parker St. Bridge & Interchange (37-2-27.8) Project US-467(1)	0.64 (0.60) (Acc.)	Asp. Conc., Opt. Bridge Welded Plate Girder 840'	$110,000 Plans $25	2,060,000
DISTRICT No. 8, K. G. Rauer, Acting District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.						
Dutchess	BA 56-2P	East Approach: Kingston–Rhinecliff Bridge (Cont. 8)	1.35	9" Cem. Conc. Pavt. 24'-36' Wide = 1.14 Mi. Asp. Conc. Opt. = 0.21 Mi.	$9,000 Plans $10	175,000
Rockland (Rte. 9W)	RC 56-27	Tompkins Cove–West Haverstraw, S.H. 8049	0.18	Cem. Conc. Sidewalks & Curbs	$700 Plans $10	13,000
Ulster	BA 56-1P	West Approach: Kingston–Rhinecliff Bridge (Cont. 6)	0.31	9" Cem. Conc. Pavt. 36'-68' Wide	$5,600 Plans $10	102,000
DISTRICT No. 9, J. C. Frederick, District Engineer, 71 Frederick Street, Binghamton, N. Y.						
Broome (Rte. 17)	FARC 56-48	Windsor–Deposit, S.H. 5338 Project F-344(21)	5.80	Asp. Conc., Opt.	$20,000 Plans $10	364,000
DISTRICT No. 10, M. E. Goul, District Engineer, 325 W. Main Street, Babylon, L. I., N. Y.						
Bronx	FAMDE 56-1	Major Deegan Expressway & Extension Cont. 18 Project U-1082(22)	7.33	Landscaping and Misc. Work	$20,000 Plans $15	360,000
Kings	FAPE 56-1	Prospect Expressway Cont. 3A Project U-1081(2)	0.78 (1.63) (Acc.)	9" Cem. Conc. Pavt. 2 @ 36' Var. Wide = 1.13 Mi. Sheet Asph. Pavt. = 1.15 Mi. Misc. Work = 0.13 Mi. 3 Hwy. Sepa. Steel Girders 114.7', 107.6', & 135.5' 1 Ped. Overpass Steel Girder 159.7'	$310,000 Plans $100	5,536,000

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Instructions to Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

Prequalification Date: July 23, 1956

Board of Education—Bureau of Construction

Notice Re Prequalification Forms for Contractors

NOTICE IS HEREBY GIVEN THAT THE Director of the Bureau of Construction, 4th Floor, 42-15 Crescent Street, Long Island City 1, New York, will receive applications for prequalification of bidders, from contractors who may wish to submit bids for the proposed hereinafter specified contracts, as follows:

For general construction, plumbing and drainage, heating and ventilating, electrical work and lighting fixtures for:

Public School 105, Amsterdam Avenue and West 97th Street, New Building, Manhattan.

Prequalification application forms will have to be secured from and must be submitted to the Director, Bureau of Construction Office, 4th Floor, Room 407, 42-15 Crescent Street, Long Island City, New York.

Bids when advertised will be received from prequalified bidders only.

The time for submitting prequalification application forms for the above contracts will expire on Monday, July 23, 1956.

WILLIAM H. CORREALE
Director

Dated: July 10, 1956.

Bids: August 8, 1956

Triborough Bridge and Tunnel Authority

SEALED BIDS WILL BE RECEIVED BY Triborough Bridge and Tunnel Authority at its office Administration Building, Randall's Island, Manhattan, New York 35, N. Y., as follows:

Until 11 a.m. on Wednesday, August 8, 1956.

For Contract No. WB57, Painting the Bronx-Whitestone Bridge and Incidental Structures, Boroughs of the Bronx and Queens, City of New York.

Each bid must be accompanied by a deposit in the amount of twenty thousand Dollars ($20,000).

Specifications, bid and contract form may be purchased at the office of the Authority for $10.00. The purchase price will not be refunded.

All information may be obtained at the office of the Authority.

U. S. Government

Department of Commerce, Bureau of Public Roads, July 3, 1956. SEALED BIDS will be received at the office of the Park Superintendent, Homestead, Florida, until 11:00 a.m., E.S.T., AUGUST 3, 1956, for Project 1A4-4A1-5A1-5OA1, Everglades National Park, Dade County, Florida. Grading, draining, processing oolite rock base, bituminous prime coat and surface treatment, and other work westerly 6.626 miles from East Park Boundary. The approximate quantities of the more important items are: 38,000 cu. yd. Stripping and Storing Topsoil, 260,000 cu. yd. Excavation for Borrow, and 320 cu. yd. Concrete. Minimum wage rates have been fixed as required by law. Plans, specifications, and proposal forms are available upon request at the offices of the Bureau of Public Roads, 1440 Columbia Pike, Arlington, Virginia, and Gatlinburg, Tennessee. H. J. Spelman, Division Engineer.

Bids: August 15, 1956

Republic of Liberia

DEPARTMENT OF PUBLIC WORKS AND UTILITIES
DIVISION OF HIGHWAYS

MONROVIA

STANDARD GOVERNMENT FORM OF INVITATION FOR BIDS
FORM NO. 20

SEALED BIDS, in single copy only, subject to the conditions contained herein, will be received until 11 o'clock A.M., Monrovia time, on the 15th day of August 1956, and then publicly opened at that time, at the office of the Secretary of the Department of Public Works and Utilities, for furnishing the materials and performing the work for constructing the Liberia, Gbarnga—Kallahun Projects SH 1-B(2), SH 1-C, SH 1-D and SH 1-E. Telegraphic bids will not be accepted. Bids received after the above time and date will not be considered. The combined length of the Projects is approximately 144.6 miles, and the items of work are approximately as follows:

Project SH 1-B(2)

Item No.	Item	Quantity	Unit
20(1)	Clearing and Grubbing	5	Acres
24(1)	Unclassified Excavation	22,000	Cu. Yds.
25(1)	Unclassified Excavation for Structures	325	Cu. Yds.
27(2)	Overhaul on Uncl. Excavation (1000' F.H.)	10,000	Sta. Yds.
28(2)	Overhaul on Select Borrow Surf. Crs. (1000' F.H.)	5,000	Cu. Yd. Mi.
30(1)	Foundation Fill	150	Cu. Yds.
37(1)	Furrow Ditches	1,000	Lin. Ft.
100(1)	Select Borrow Surface Course (Laterite)	1,600	Cu. Yds.
206(1)	Class "A" Concrete	845	Cu. Yds.
206(2)	Class "B" Concrete	60	Cu. Yds.
206A(5)	Class "Y" Concrete	16	Cu. Yds.
207(1)	Reinforcing Steel	167,000	Lbs.
220(1)	Structural Steel	213,000	Lbs.
249(1)	Concrete Block Masonry Headwalls	8	Cu. Yds.
250(3)	24" Standard Str. Reinf. Concrete Pipe	42	Lin. Ft.
250(4)	30" Standard Str. Reinf. Concrete Pipe	60	Lin. Ft.
250(5)	36" Standard Str. Reinf. Concrete Pipe	60	Lin. Ft.
255A(3)	24" Bituminous coated corr. sheet metal Culvert Pipe, Type 2, Nestable	42	Lin. Ft.
255A(4)	30" Bituminous coated corr. sheet metal Culvert Pipe, Type 2, Nestable	60	Lin. Ft.
255A(5)	36" Bituminous coated corr. sheet metal Culvert Pipe, Type 2, Nestable	60	Lin. Ft.
310(1)	Loose Rip Rap	800	Cu. Yds.
Extra Work:	Stone Ditch checks, planting grass, etc	Lump Sum	

Project SH 1-C

20(1)	Clearing and Grubbing	385	Acres
24(1)	Unclassified Excavation	940,000	Cu. Yds.
25(1)	Unclassified Excavation for Structures	8,500	Cu. Yds.
27(2)	Overhaul on Uncl. Excavation (1000' F.H.)	263,000	Sta. Yds.
28(2)	Overhaul on Select Borr. Surf. Crs. (1000' F.H.)	400,000	Cu. Yds. Mi.
30(1)	Foundation Fill	3,000	Cu. Yds.
37(1)	Furrow Ditches	62,500	Lin. Ft.
100(1)	Select Borrow Surface Course (Laterite)	143,000	Cu. Yds.
206(1)	Class "A" Concrete	4,500	Cu. Yds.
206(2)	Class "B" Concrete	90	Cu. Yds.
206A(5)	Class "Y" Concrete	10	Cu. Yds.
207(1)	Reinforcing Steel	510,000	Lbs.
249(1)	Concrete Block Masonry Headwalls	600	Cu. Yds.
250(1)	15" Standard Reinf. Conc. Pipe Culvert	480	Lin. Ft.
250(2)	18" Standard Reinf. Conc. Pipe Culvert	600	Lin. Ft.
250(3)	24" Standard Reinf. Conc. Pipe Culvert	1,104	Lin. Ft.
250(4)	30" Standard Reinf. Conc. Pipe Culvert	5,721	Lin. Ft.
250(5)	36" Standard Reinf. Conc. Pipe Culvert	2,649	Lin. Ft.
250(6)	48" Standard Reinf. Conc. Pipe Culvert	3,876	Lin. Ft.
250(7)	60" Standard Reinf. Conc. Pipe Culvert	162	Lin. Ft.
255A(1)	15" Bituminous coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	480	Lin. Ft.
255A(2)	18" Bituminous coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	600	Lin. Ft.
255A(3)	24" Bituminous coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	1,104	Lin. Ft.
255A(4)	30" Bituminous coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	5,721	Lin. Ft.
255A(5)	36" Bituminous coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	2,649	Lin. Ft.
255A(6)	48" Bituminous coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	3,876	Lin. Ft.
255A(7)	60" Bituminous coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	162	Lin. Ft.
310(1)	"Loose Rip Rap"	700	Cu. Yds.
Extra Work:	Stone Ditch checks, Planting grass on Embankment Slopes, etc	Lump Sum	

Project SH 1-D

20(1)	Clearing and Grubbing	400	Acres
24(1)	Unclassified Excavation	1,110,000	Cu. Yds.
25(1)	Unclassified Excavation for Structures	9,000	Cu. Yds.
27(2)	Overhaul on Uncl. Excav. (1000' F.H.)	260,000	Sta. Yds.
28(2)	Overhaul on Select Borrow Surf. Crs (1000' F.H.)	400,000	Cu. Yd. Mi.
30(1)	Foundation Fill	3,000	Cu. Yds.
37(1)	Furrow Ditches	62,000	Lin. Ft.
100(1)	Select Borrow Surface Course	143,000	Cu. Yds.
206(1)	Class "A" Concrete	4,050	Cu. Yds.
206(2)	Class "B" Concrete	200	Cu. Yds.
206A(5)	Class "Y" Concrete	35	Cu. Yds.
207(1)	Reinforcing Steel	566,000	Lbs.
249(1)	Concrete Block Masonry Headwalls	525	Cu. Yds.
250(1)	15" Standard Str. Reinf. Conc. Culvert Pipe	300	Lin. Ft.
250(2)	18" Standard Str. Reinf. Conc. Culvert Pipe	600	Lin. Ft.
250(3)	24" Standard Str. Reinf. Conc. Culvert Pipe	1,080	Lin. Ft.
250(4)	30" Standard Str. Reinf. Conc. Culvert Pipe	3,330	Lin. Ft.
250(5)	36" Standard Str. Reinf. Conc. Culvert Pipe	2,660	Lin. Ft.
250(6)	48" Standard Str. Reinf. Conc. Culvert Pipe	4,509	Lin. Ft.
255A(1)	15" Bituminous coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	300	Lin. Ft.
255A(2)	18" Bituminous coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	600	Lin. Ft.
255A(3)	24" Bituminous coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	1,080	Lin. Ft.
255A(4)	30" Bituminous coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	3,300	Lin. Ft.
255A(5)	36" Bituminous coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	2,660	Lin. Ft.
255A(6)	48" Bituminous coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	4,590	Lin. Ft.
310(1)	"Loose Rip Rap"	900	Cu. Yds.
Extra Work:	Stone Ditch checks, Planting grass on Embankment Slopes, etc	Lump Sum	
Special Provisions:	Construct Ferry at Loffa River	Lump Sum	

Project SH 1-E

20(1)	Clearing and Grubbing	420	Acres
24(1)	Unclassified Excavation	1,200,000	Cu. Yds.
25(1)	Unclassified Excavation for Structures	9,500	Cu. Yds.
27(2)	Overhaul on Uncl. Excav. (1000' Free Haul)	253,000	Sta. Yds.
28(2)	Overhaul on Select Bor. Surf. Crs. (1000' F.H.)	400,000	Cu. Yd. Mi.
30(1)	Foundation Fill	3,500	Cu. Yds.
37(1)	Furrow Ditches	62,500	Lin. Ft.
100(1)	Select Borrow Surface Course	150,000	Cu. Yds.
206(1)	Class "A" Concrete	3,100	Cu. Yds.
206(2)	Class "B" Concrete	200	Cu. Yds.
206A(5)	Class "Y" Concrete	35	Cu. Yds.
207(1)	Reinforcing Steel	450,000	Lbs.
249(1)	Concrete Block Masonry Headwalls	600	Cu. Yds.
250(1)	15" Standard Str. Reinf. Conc. Pipe Culvert	480	Lin. Ft.
250(2)	18" Standard Str. Reinf. Conc. Pipe Culvert	600	Lin. Ft.
250(3)	24" Standard Str. Reinf. Conc. Pipe Culvert	1,100	Lin. Ft.
250(4)	30" Standard Str. Reinf. Conc. Pipe Culvert	5,175	Lin. Ft.
250(5)	36" Standard Str. Reinf. Conc. Pipe Culvert	2,800	Lin. Ft.
250(6)	48" Standard Str. Reinf. Conc. Pipe Culvert	4,600	Lin. Ft.
250(7)	60" Standard Str. Reinf. Conc. Pipe Culvert	150	Lin. Ft.
255A(1)	15" Bituminous Coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	480	Lin. Ft.
255A(2)	18" Bituminous Coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	600	Lin. Ft.
255A(3)	24" Bituminous Coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	1,100	Lin. Ft.
255A(4)	30" Bituminous Coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	5,175	Lin. Ft.
255A(5)	36" Bituminous Coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	2,800	Lin. Ft.
255A(6)	48" Bituminous Coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	4,600	Lin. Ft.
255A(7)	60" Bituminous Coated Corr. Sheet Metal Culvert Pipe, Type 2, Nestable	150	Lin. Ft.
310(1)	Loose Rip Rap	800	Cu. Yds.
Extra Work:	Stone Ditch checks, Planting grass on Embankment Slopes, etc	Lump Sum	

The Government will permit the contractor to import duty free, any supplies or materials incorporated in the work, or equipment used on the work. The contractor will furnish all equipment necessary for construction of the work and all materials and supplies incorporated in the work unless specific mention is made to the contrary in the Special Provisions or Invitation for Bids. Supplies or materials not of Liberia or United States origin or manufacture shall not be used on this project without the written consent of the Secretary of the Department of Public Works and Utilities.

Preference of employment in all categories shall be given to qualified Liberian and United States citizens, but only Liberian citizens may be employed as Unskilled Labor, except upon written permission of the Secretary of the Department of Public Works and Utilities. Only Bids from qualified Liberian or United States firms or entities presently incorporated in, or licensed to operate in, either country will be considered. Bidders' attention is called to Article 13 "Officials Not To Benefit"; Article 17, "Domestic Preference"; aid Article 22, "Preference of Employment", of the Contract and Proposal.

Competency of Bidders shall be indicated by the submission at the earliest possible date prior to submission of bids of the Attested Statements and Questionnaires prescribed in Article 2.6 of "Specifications FP-41". These forms will be furnished with the Proposals.

The plans, specifications, special provisions, and Pre-qualification Questionaires may be obtained at the Department of Public Works and Utilities, Office of the Chief Engineer, Monrovia, R. L., and will also be available for examination at the Liberian Embassy and the Bureau of Public Roads in Washington, D. C. U. S. A. When copies of plans and specifications are requested, a deposit of $100.00 (cash or certified check) will be required to insure their return. If these are not returned with in (15) fifteen days after opening of bids the deposit will be forfeited to the Government. Certified checks should be made upon a Monrovia Bank or reputable firm approved by the Secretary of the Department of Public Works and Utilities, and payable to the Bureau of Revenues, Republic of Liberia.

Performance of the contract shall begin within (60) sixty Calendar days after the date of the Notice to Proceed and the contract shall be completed within 720 calendar days, subject to such extensions as may be authorized by the terms of Article 8.6 of "Specifications FP-41". Contract time will begin (60) sixty days after the Notice to Proceed and will run concurrently on Projects SH 1-B(2), SH 1-C, and SH 1-D.

Notice to Proceed on Project SH 1-E shall be given within (60) sixty days of the estimated time of completion of grading plans, and contract time will begin (60) sixty days after the Notice to Proceed. Contract time for Project SH 1-E shall be 360 calendar days, subject to such extensions as may be authorized by the terms of Article 8.6 of "Specifications FP-41".

A Bid Bond, or cash, or negotiable check payable to the Republic of Liberia, in the amount of 5% of the amount of the bid must accompany the Bid, otherwise the Bid will not be considered. This security will be returned upon award to the contractor. Performance and payment Bonds, each in the amount of 20% of the Bid Amount will be required.

Liquidated damages for delay will be as set forth in Article 8.7 of "Specifications FP-41," as modified by the Special Provisions. Partial payments will be made as set forth in Article 9.6 of "Specifications FP-41." No partial payments will be made, however, when the amount due is less than $500.

The right is reserved, as the interests of the Government may require, to reject any and all bids, and to waive any informality in bids received.

Envelopes containing bids must be sealed, marked and addressed as follows:

BID FOR CONSTRUCTION
Liberia, Saint Paul River-Kallahun, Projects SH 1-B(2), SH 1-C SH 1-D and SH 1-E.

The Honorable
The Secretary of Public Works and Utilities
Department of Public Works and Utilities
Monrovia, Liberia.

NOTE: See copies of Standard Government Instructions to Bidders, Standard Government Form of Contract, which are part of this Proposal and Contract.
In the interest of uniformity, bidders are required to complete the forms provided in the Proposal and Contract, or exact copies of them when submitting bids. These are: Bid Schedule; Bid (Construction Contract); Contract (Construction); Standard Government Form of Bid; Bid Bond (Construction or Supply); Performance Bond (Construction or Supply); and Payment Bond (Construction).

OFFICIAL PROPOSALS

Bids: July 20, 1956

Contract O & M —395

ADVERTISEMENT
THE PORT OF NEW YORK AUTHORITY
OUTERBRIDGE CROSSING
PAVEMENT RESURFACING
ON NEW JERSEY APPROACH SPAN

Sealed proposals for furnishing all labor, material and equipment for resurfacing pavement on the New Jersey Approach Span of the Outerbridge Crossing will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, until 11:00 A.M., Monday, July 30, 1956, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt in duplicate will be issued. The duplicate copy of the receipt is then to be delivered to the Department of Purchase and Administrative Services, and you will be furnished with the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, July 19, 1956

Bids: July 30, 1956

Contract O & M — 391

ADVERTISEMENT
THE PORT OF NEW YORK AUTHORITY
LA GUARDIA AIRPORT
PAVEMENT IMPROVEMENTS AND
SEALCOATING

Sealed proposals for furnishing all labor, material and equipment for the performance of paving improvements and sealcoating at La Guardia Airport will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, until 11:00 A.M., Monday, July 30, 1956, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt in duplicate will be issued. The duplicate copy of the receipt is then to be delivered to the Department of Purchase and Administrative Services, and you will be furnished with the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, July 19, 1956

Bids: July 30, 1956

Contract O & M — 389

ADVERTISEMENT
THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
PAVING AND DRAINAGE
IMPROVEMENTS

Sealed proposals for furnishing all labor, material and equipment for paving and drainage improvements on roadways and taxiways at New York International Airport will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, until 11 A.M., Monday, July 30, 1956, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt in duplicate will be issued. The duplicate copy of the receipt is then to be delivered to the Department of Purchase and Administrative Services, and you will be furnished with the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, July 19, 1956

BIDS: July 31, 1956

Contract NA—350.003

ADVERTISEMENT
THE PORT OF NEW YORK AUTHORITY
NEWARK AIRPORT
PASSENGER TERMINAL
ROOF OPENINGS

Sealed proposals for cutting openings and the furnishing and installation of scuttles in the roof of the Passenger Terminal at Newark Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, July 31, 1956, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115, and copies will be furnished upon request. No deposit will be required but the documents shall be returned in good condition not later than forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, July 19, 1956

Bids: July 31, 1956

The Richmond-Petersburg Turnpike Authority
Richmond, Virginia

July 5, 1956

NOTICE IS HEREBY GIVEN that Sealed Bids will be received by The Richmond-Petersburg Turnpike Authority for:

CONTRACT NO. E-1-G, SECTION E

Construction of The Richmond-Petersburg Turnpike, Contract E-1-G, Section E, Appomattox River Crossing—Grading, Drainage, Paving and Structures; from Bollingbrook Street to the north bank of the Appomattox River in the City of Petersburg.

The approximate length of the Project is 2,010 feet.

Bids for the above described work will be received at the office of The Richmond-Petersburg Turnpike Authority, 1015 East Main Street or by mail at P. O. Box 1-R, Richmond 2, Virginia, until 10:00 A.M. (EST) 11:00 A.M. (DST), July 31, 1956 and will be publicly opened and read aloud immediately thereafter in the Hunt Room of the Hotel Raleigh, 9th and Bank Streets, Richmond, Virginia.

Bids will be received only from those bidders who are registered in the State of Virginia and who are prequalied with The Richmond-Petersburg Turnpike Authority.

Plans, Specifications, Proposal, and form of Proposal Bond, Contract and Contract Bond are on file at the offices of The Richmond-Petersburg Turnpike Authority, 1015 East Main Street, Richmond, Virginia, and at the offices of the Engineers, Parsons, Brinckerhoff, Hall & Macdonald, 51 Broadway, New York, New York, where they may be inspected by prospective bidders during office hours.

Plans and Specifications (including Proposal Form, Proposal Bond Form, Contract and Contract Bond Form, Special Provisions and Turnpike Supplemental Specifications) will be furnished to registered prequalified contractors for $30.00 per set, from the office of The Richmond-Petersburg Turnpike Authority. Virginia Department of Highways, Road and Bridge Specifications may be purchased for $1.00 per copy each. No refund will be made for any of the above stated charges.

All work shall be done in accordance with the Plans and the Virginia Department of Highways, Road and Bridge Specifications dated April 1, 1954 as amended by The Turnpike Supplemental Specifications dated March 1956; both as amended by the Special Provisions.

The Authority reserves the right to reject any or all bids, submitted in response to this advertisement, and to waive technicalities as it may deem best for the interest of the Authority.

NOTE: Plans and Specifications will not be mailed prior to the receipt of payment of cost shown in this Advertisement.

The Richmond-Petersburg Turnpike Authority
W. L. Daniel
Acting General Manager

Bids: July 25, 1956

Pennsylvania Turnpike Commission
Harrisburg, Pennsylvania

NOTICE TO BIDDERS

Sealed proposals will be received by the Pennsylvania Turnpike Commission through the Chairman, 11 North Fourth Street, Harrisburg, Pennsylvania, until 10:30 a.m., Eastern Daylight Saving Time, the 25th day of July 1956, and immediately thereafter will be taken to the Public Utility Commission's Hearing Room #1, North Office Building, State Capitol, Harrisburg, Pennsylvania, and publicly opened and read aloud for the following contract:

Contract No. 180-F consists of fine grading and paving with a crushed aggregate base course and a bituminous surface course all parking and roadway areas at the Turnpike Administration Building presently being constructed near Highspire.

The approximate quantities are:

13,052 Sq. Yds. Subgrade
13,052 Sq. Yds. 8" Crushed Aggregate Base Course, Type B
13,052 Sq. Yds. 2½" Bituminous Surface Course, ID-2

Copies of plans, specifications and Contract Documents are on file and open to public inspection on 11 July 1956, at the office of the Pennsylvania Turnpike Commission in Harrisburg, Pennsylvania. Plans, specications and other contract documents will not be available before this date for mailing to prospective bidders.

Plans and contract documents may be obtained from the Commission upon payment of ten ($10.00) dollars for each set. Copies of the Specifications for grading, drainage, paving and structures may be purchased from the Pennsylvania Turnpike Commission for the sum of five ($5.00) dollars per copy. No refund will be made for plans or contract documents returned unless the project is withdrawn from letting by the Pennsylvania Turnpike Commission.

Remittances are payable by check or P.O. money order to the Pennsylvania Turnpike Commission and must accompany requests for specifications and contract documents.

The character and amount of bid security to be furnished by bidder is stated in the Instructions to Bidders.

No bids may be withdrawn for thirty (30) days after the scheduled closing time for receipt of bids.

The Pennsylvania Turnpike Commission reserves the right to waive any informalities in or to reject any or all bids.

PENNSYLVANIA TURNPIKE
COMMISSION
John F. Byrne
Secretary and Treasurer

Harrisburg, Pennsylvania
2 July 1956

Bids: August 21, 1956

Port of New Orleans

ADVERTISEMENT

Sealed bids will be received by the Board of Commissioners of the Port of New Orleans at their office, Room 204, No. 2 Canal Street, until Tuesday, August 21, 1956, at 2:00 o'clock P. M., and then publicly opened for furnishing approximately 11,400 tons of steel H-beam bearing piles.

Deposit of three per cent of the sum bid, by certified check only, certified by an accredited officer of an accredited bank, is required with each bid.

A surety bond, in acceptable surety company, for fifty per cent of the amount of the contract, is required with notarial contract.

Specifications and bid forms are on file in the Board's office mentioned above. Complete sets will be furnished to prospective bidders on application.

The right is reserved to accept or reject any or all bids and to waive informalities, and to award a contract or contracts as the Board may determine to be for its best interests.

OFFICIAL PROPOSALS

Bids: July 26, 1956

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and Article 2, Title 9 of the Public Authorities Law, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 26th day of July 1956, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects: ROCKLAND COUNTY, Kurt G. Rauer, Act'g. Dist. Engr., Pleasant Valley Rd., Poughkeepsie, N. Y.

Contract No.	Type	Name of Highway and Miles	Deposit for Plans	Bid Deposit	Department Estimate
T.A.G.S. 56-28	9" Cem. Conc. Pavt. 2 at 25' Var.; Asp. Conc. Opt.; 6 Hy. Sups. Prestressed Concrete Stringers 280.9', 294.6', 112.5', 126', 216.5', & 244.3'; 2 Hy. Sups. Widen & Extend Exist. Comp. I-Beams 144.8' & 208.3'	NYS Thruway Hudson Sec., Sub. 8A (Connection to Garden State Parkway) & 3 Secondary Rds. 2.764 Thy. 3.633 Ramps 0.463 Acc. Miles	$100	$266,000	$5,303,000

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Instructions to Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

Bids July 26, 1956

New York State Road Work

NOTICE TO CONTRACTORS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Laws, sealed proposals will be received until 10:30 A.M., Eastern Daylight Saving Time, on July 26, 1956, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

SOIL EXPLORATIONS AND FOUNDATIONS AT VARIOUS SITES ON ROUTE 17 EXPRESSWAY, DEPOSIT-McCLURE, TOWNSHIPS OF SANFORD AND DEPOSIT, DELAWARE AND BROOME COUNTIES, WHICH CONSTITUTES CONTRACT NO. SM-92.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, New York.
(b) Mr. Joseph Federick, District Engineer, 71 Frederick Street, Binghamton, New York.
(c) Mr. William M. Trainer, Associate Contract Engineer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

The Engineer's estimate of cost for this work is $36,150.00.

Proposal for this contract must be submitted in separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $1825.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instruction to Bidders."

The right is reserved to reject any or all bids.

J. W. JOHNSON
SUPERINTENDENT OF PUBLIC WORKS

Bids: July 26, 1956

New York State Road Work

NOTICE TO CONTRACTORS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 A.M., Eastern Daylight Saving Time, on July 26, 1956, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

SOIL EXPLORATION AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON ARTHUR V. SHERIDAN EXPRESSWAY (BRONX RIVER EXPRESSWAY) EAST 165th STREET TO EAST 174th STREET, BRONX COUNTY, WHICH CONSTITUTES CONTRACT NO. SPEC. SM-91.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, New York.
(b) Mr. M. E. Goul, District Engineer, 325 West Main Street, Babylon, Long Island.
(c) Mr. William M. Trainer, Associate Contract Engineer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

The Engineer's estimate of cost for this work is $6475.00.

Proposal for this contract must be submitted in separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $350.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instruction to Bidders."

The right is reserved to reject any or all bids.

J. W. JOHNSON
SUPERINTENDENT OF PUBLIC WORKS

Bids: August 23, 1956

City of Elizabeth, New Jersey

NOTICE TO BIDDERS

Sealed proposals for the construction of Storm Drains in connection with Storm Drainage Relief Project for the Northwesterly area in the City of Elizabeth, will be received by the Board of Public Works of the City of Elizabeth, New Jersey, at a meeting to be held in the Council Chamber at the City Hall at 2:00 P.M., E.D.S. Time on Thursday, August 23, 1956, and then publicly opened and read. No proposal will be accepted after said hour. Proposals will be received on each:

Contract I: Construction of Storm Drains and Appurtenances on Newark Avenue, Alina Street, Fanny Street, etc., to foot of Alina Street.

Contract II: Construction of Storm Drains and Appurtenances on Alina Street, Cross Avenue, Lower Road to Newark, etc. to Weequahic Lake.

Information for Bidders, Proposal forms, specimen Contract, Plans, Specifications and other pertinent Contract Documents for any or all of the foregoing contracts may be examined at the office of Alexander Potter Associates, Consulting Engineers, 50 Church St., New York, and at the office of the City Engineer, City Hall, Elizabeth, N. J., between the hours of 10 A.M. and 4 P.M. daily except Saturdays, Sundays and holidays and there obtained upon making a deposit of Fifty ($50.00) dollars, which will be refunded to bidders within thirty (30) days after the proposals are opened and upon return of the data undamaged. Half of this deposit will be refunded to non-bidders.

Extra copies of specifications may be obtained at the cost of Ten ($10.00) dollars each and extra sheets may be obtained at the cost of One ($1.00) dollar each which sums will not be refunded.

Bidders may submit proposals for each contract or a combination bid for both contracts.

The scope of work under each contract is as follows:

CONTRACT I: Approximately 3000 lin. ft. of reinforced concrete culvert pipe varying in size from 15-inch to 42-inch diameter, approximately 4700 lin. ft. reinf. concrete culvert pipe varying in size from 48 to 72-inch diam., approx. 500 lin. ft. of asbestos-cement pipe 10 to 18" diam., approx. 400 lin. ft. of vit. clay pipe 10-12" diam., 26 manholes, 52 curb inlets and catch basins, one siphon of reinf. concrete, 5 overflow M.Hs. of reinf. concrete, 5300 lin. ft. pavement, reconstruction of gas & water utilities, etc.

CONTRACT II: Approximately 5400 lin. ft. of reinforced concrete culvert pipe varying in size from 15" to 42" diam., approx. 2600 lin. ft. reinf. concrete culvert pipe 60" diam., approx. 1000 lin. ft. 48x76 reinf. concrete pipe, 30 manholes, 42 catch basins and curb inlets, 6600 lin. ft. pavement, 1600 sq. yds. concrete pavement, reconstruction of gas & water utilities, etc.

Prospective bidders will be required to fill in answers in Questionnaire of Financial Statement which is authorized by State Law and which must be approved by the Board of Public Works before bidders are eligible for bidding. Questionnaire forms may be obtained at the office of the City Engineer.

No proposal shall be considered unless accompanied by a bid bond of a corporation acceptable to the City, or a cashier's check or a certified check upon some good and acceptable bank, in the penal sum of 10% of the total amount of each bid as a guarantee that if the contract upon which the bidder has bid shall be awarded to said bidder, he will enter into a contract for the work and do so within the time stipulated in the Notice of Award for said work and failing to do so the bidder and surety shall forfeit to the City of Elizabeth, the amount of said Bid Bond or check. The Bid Bond shall be executed by the bidder and surety company on form furnished by the City.

A bidder to whom a contract is awarded shall furnish a Performance Bond on a surety company duly licensed in the State of New Jersey, in the sum of 100 per cent of the amount of the contract, conditioned upon the faithful performance of the terms of the contract.

The successful bidder will be required to comply with all State Laws governing the execution of Municipal contracts in the State of New Jersey.

The Board of Public Works reserves the right to reject any and all bids as it may deem best for the interests of the City of Elizabeth, and to waive any informality in the bid.

BY DIRECTION OF THE
BOARD OF PUBLIC WORKS
Robert S. Everett
Clerk, Board of Public Works
July 12, 1956

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

NATIONAL COVERAGE

Positions Vacant
Positions Wanted
Part Time Work

Civil Service Opportunities
Selling Opportunities Wanted
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Employment Agencies
Employment Services
Labor Bureaus

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The advertising rate is $28.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

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Subject to Agency Commission.

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Permanent openings in our St. Louis and San Francisco offices for qualified personnel experienced in design of structural steel and reinforced concrete for work on

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Openings also available for mechanical and electrical designers and draftsmen for work on power plants, test facilities, large electrical installations and general industrial projects. Several recent graduate engineers will be added in all categories.

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REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
New York: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Assistant Professor—To teach undergraduate courses in structures and applied mechanics. Salary depends on qualifications of applicant. Department of Civil Engineering, University of North Dakota, Grand Forks, N. Dak.

Accountant . . . able to fill responsible position in main office of medium size construction firm. Prefer man in early 40's with experience in construction accounting. Located in central Connecticut. Send full details and salary requirements. Reply P-2176, Engineering News-Record.

Asphalt Batch Plant & Laydown Inspectors. Also, soils lab. tech.—O'seas Airbase, mild climate. Call or write Mr. Lambert, Patchen & Zimmerman, 120 Greenwich St. NYC RE2-4187.

Civil and structural engineers by consultant on buildings, bridges and highways. Excellent opportunity for several well qualified men. Box 121, Station H, Toledo, Ohio. Replies acknowledged.

Bridge construction superintendent wanted for work in Florida. Submit experience record, qualifications, wages desired, references, etc. Must be experienced in all phases of reinforced concrete and steel bridge construction. P-2148, Engineering News-Record.

Civil Engineers, Designers, Draftsmen experienced in the design of sewers, pumping stations, sewage treatment plants, water supply systems, structural and hydraulic design, hydraulic computations, specs. O'Brien & Gere 400 E. Genesee St., Syracuse, N. Y.

Registered Engineer with minimum 5 years experience in tunnel construction to act in capacity of safety engineer for Ohio sewer project. Familiarity with compressed air construction and all safety methods essential. Please state full qualifications, experience, references and salary requirements in first letter. P-2221, Engineering News-Record.

Highway and Bridge Designers and Draftsmen needed for work in Rhode Island area. Send experience record to P. O. Box 752, Providence, Rhode Island.

Engineers for municipal and industrial water supply, sewerage and treatment projects. Opportunities for permanent connection with long established firm of consulting engineers in mid-west. Both E.I.T.'S and engineers considered. Full information and references in first letter requested. P-2316, Engineering News-Record.

Road Construction Superintendent, Southern Connecticut area. All types of road construction, preferably asphalt. Please state qualifications. All replies held confidential. P-2348, Engineering News-Record.

Civil Engineers to work with consulting engineering firm. Long established municipal consulting firm desires to secure civil engineers for permanent positions. Experience in some phase of municipal Engineering required. Offices located in very desirable small college community in Colorado area. Expansion of firms operations provide unlimited opportunities for advancement for properly qualified engineers. Firm desires to employ engineers with from one to fifteen years experience. Salaries $5,100 to $7,200. Please give experience and full details in reply. Replies will be held confidential if requested. P-2374, Engineering News-Record.

CIVIL ENGINEERS

Grade III up to $8061; Grade II up to $6849. Municipal work in the design of streets, sewers, and sanitary installations. Opportunity to gain valuable experience. Some field check in following designs through to completion. Immediate vacancies for seven men. Exceptional fringe and pension benefits. Write to Department of Personnel, City Hall, Dearborn, Michigan, submitting qualifications and expected salary.

POSITIONS VACANT

Engineers—Civil, Hydraulic, Dam, or Soils Chief, Dams Division, minimum of ten years responsible engineering experience in the design and construction of dams. Applicant must be familiar with soil mechanics foundations, hydraulics, hyrology, and construction procedures. Will be responsible for program involving inspection of existing dams, processing applications for permits to build dams, dam analysis and reviewing dam construction procedure. Chief, Design Branch, minimum of eight years responsible engineering experience in the design of flood control or related type projects. Applicant must be familiar with soil mechanics, hydraulics, hydrology, and concrete design. Will supervise design groups engaged in design of flood control projects, preparation of preliminary reports and construction drawings. Design Engineers—Civil, Hydraulic, and Soils engineers with no experience to extensive experience in respective fields. Work includes broad phases of hydraulics, hydrology, soil mechanics and concrete design on local flood protection projects. Broad experience available in planning, design and construction of projects. Civil engineers with construction experience on hydraulic structures also required. Dam Engineers, minimum of four years experience in the construction and/or design of dams. Applicants should have a working knowledge of soil mechanics and concrete control. Duties involve review of plans and specifications, field investigations and inspections and design analysis. Location and Salary — Pennsylvania. Salary commensurate with experience with range of $4524 to approximately $9000 per annum. Fringe benefits including vacation, sick and holiday leave, travel expenses and retirement system. State education, experience, age, salary expected and references. Address replies to P-2381, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

Construction Executive: Fully qualified. Seventeen years in all phases of commercial and industrial construction. Estimating to completion, contract negotiation, project management. Age 40. Domestic or foreign. Seek new permanent connection with possible future advancement. Minimum $14,000. P-2360, Engineering News-Record.

Assistant Editor.—Opportunity for a recent CE graduate, or a graduate with some civil engineering experience, to begin a career of technical editing and engineering journalism. Beginning salary dependent on relative qualifications of applicants. Letter should state education, literary and personal details. P-2359, Engineering News-Record.

City Engineer, Neosho, Missouri; Graduate or registered man with some municipal experience. Write City Manager Neosho, Missouri, for further details.

Engineer of Tests: For multi-plant portland cement mfr. Should have good understanding of cement chemistry plus experience with concrete. Sporadic travel expected but work primarily in Chicago office. Please list qualification, salary range desired and personal data in your letter. Reply P-2365, Engineering News-Record.

Wanted: Civil Engineers for permanent work on bridges in both design and field offices of established consulting engineer. Please send education and experience resume, references, and salary rquirement. P-2368, Engineering News-Record.

Superintendent of Public Works: Registered New York State. 5 - 10 years experience municipal engineering, and/or utility engineering. Will supervise and assist, small but growing western New York State village in all engineering matters including design, layout and inspection of construction of streets, sewers, buildings, and sub-divisions. Will manage Water & Light Department, including electric generation, water treatment and steam heating distribution. Salary $7500 to $10,000 based on experience. P-2343, Engineering News-Record.

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Recent graduate with limited or no work experience. For Company's training program in Saudi Arabia.

Salary commensurate with qaulifications.

Write outlining personal history and work experience. Please include telephone number.

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RW-2292, Engineering News-Record
Classified Adv. Div., P.O. Box 12, New York 36, N.Y.

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Graduate Chemical, Mechanical and Electrical Engineers with minimum 5 years' experience. For specialized assignments commensurate with qualifications in plant maintenance, inspection, technical services, process studies and related work. Write giving full particulars regarding personal history and work experience. Please include your telephone number.

Recruiting Supervisor, Box 95

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Thoroughly experienced in Multi-story reinforced concrete building construction. 3 year project in growing area in South Eastern Pennsylvania. Living facilities readily available in vicinity of project. Write stating resume of experience, salary desired and names and addresses of last two employers.

P-2391, Engineering News-Record
Class. Adv. Div. P.O. Box 12, N.Y. 36, N.Y.

POSITIONS VACANT

Hydraulic Engineer: The State of New Jersey has immediate vacancies for graduate civil engineers interested in flood control or water supply development studies. Positions under Civil Service with retirement provisions. Entrance salary $4560 to $6420, depending upon qualifications. For further information write to Division of Water Policy and Supply, 520 East State Street, Trenton, 25, New Jersey.

Senior Cost Engineer familiar with the Uniform System of Accounts for electric utilities. Duties will consist of analyzing completed major construction projects for an Electric Utility. Experience with the Federal Power Commission or a State Public Service Commission would be desirable. Some experience with the Property Record Department of any Electric Utility would also be an asset. Indianapolis Power and Light Company, Employment Department, 1230 West Morris St., Indianapolis, Indiana.

Wanted Civil Engineers as resident engineers on large sewage project involving sewage treatment plant, pumping stations, and 63½ miles of intercepting sewers including 30 miles in tunnel. Must be experienced. Give full particulars and salary first letter. Allegheny County Sanitary Authority, 701 Civil Building, Pittsburgh 19, Pennsylvania.

Associate Professor of Civil Engineering—BS & MS in Civil Engineering to teach engineering mechanics, surveying, highway & reinforced concrete. Salary $5400 for nine months. Location—Texas. P-2297, Engineering News-Record.

Graduate Civil Engineer, Architectural Engineer, or Architect with experience in building construction to make quantity surveys of building materials. Interested in man desiring to locate in Wichita, Kansas, permanently. Martin K. Eby Construction Co., Inc., 610 N. Main, Wichita, Kansas.

Water System Superintendent wanted by City of Rock Island, Illinois. Superintendent has charge of production, distribution treatment, storage of water for City of 50,000. Qualifications: 5 years experience as water superintendent, or division head in city water utility. College graduate preferred. Age: under 50. Salary: $6,720 to $7,680—Opportunity for advancement. Apply Director of Personnel, City Hall, Rock Island, Illinois.

POSITIONS WANTED

Senior Hydraulic & Irrigation Engineer— varied and extensive experience in the design of irrigation, drainage and flood control projects: Available for either foreign or U.S. assignments. PW-2213, Engineering News-Record.

Construction Superintendent, experienced with refineries, chemical plants, all types of heavy construction, good estimator and cost engineer, either engineering or detailed estimates, available soon. Age 47, speaks, reads and writes Spanish, Latin American experience, location unimportant, have good following. Prefer chemical plant or mill and smelter, comprehensive all crafts. PW-2142, Engineering News-Record.

Construction executive, 33, B.S., general manager, estimator, thoroughly experienced industrial, commercial construction. Location immaterial. PW-2181, Engineering News-Record.

Const. Eng. & Supt. Grad. C.E. 48 yrs. old. Experienced on industrial commercial & school work. Loc. East. PW-2260, Engineering News-Record.

Construction Executive. Sound field and office experience on Buildings and heavy construction, qualified to handle all phases of contracting, seeks new connection as project manager, chief estimator or similar position requiring top man. Now employed. Minimum $15,000. PW-2240, Engineering News-Record.

Construction Executive, buildings and heavy construction, sound experience bid to completion, qualified to manage a project branch office or a business, seeks new connection where top man is required. Minimum $15,000. PW-8792, Engineering News-Record.

POSITIONS WANTED

Construction Engineer—Executive over 25 years on all types of construction also cost engineering. Over 10 years in South America, know Spanish. Interested in top flight job only. Foreign assignment preferred. PW-2363, Engineering News-Record.

Construction Management. Project Superintendent, Superintendent 15 years experience in all phases of building construction, public works, housing and industrial work, specializing in concrete construction. Age 35—will relocate. PW-2349, Engineering News-Record.

Project supt. engineer background twenty years bridges, foundations, highways, bldgs. Desire profit share contract. Southeast U. S. PW-2355, Engineering News-Record.

Licensed Architectural engineer steel & concrete design, formerly with Albert Kahn, & Strucon Steel Co. Detroit Mich. etc. Harry A. Acy 1932 Deer Park Ave. Louisville, Ky.

Young executive engineer 32—aggressive, ambitious, tactful, BSCE. 7 yrs. field exper. heavy industrial constr. Knows costs, planning, field management. Present salary $8,000. Desires opportunity. PW-2361, Engineering News-Record.

Overseas Estimator-Draftsman age 33. 10 yrs experience in mechanical layout and construction. Good practical background. Adaptable to adverse conditions. Two or three year contract desired. PW-2364, Engineering News-Record.

District Manager for internationally known company wants change. Masters Degree, 39, machinery, control techniques, electronics, business and management ability. Present gross income $14,000. Overseas considered. PW-2345, Engineering News-Record.

Engineer, Civil, Structural. Finishing Latin-American job. Desires foreign assignment. Field and office 17 years experience, planning, design, structures of steel and concrete, buildings, railway and highway bridges. Supervise others. Speaks Spanish. Family status. PW-2313, Engineering News-Record.

Construction Manager 31. B.S.C.E. experience in highways, dams, sewerage & water works as engr-in-charge & as superintendent. Have specialized in construction supervision & management. Present salary $7600. Midwest location preferred. PW-2281, Engineering News-Record.

Civil, Structural Engineer, 26, M.C.E., married 4 years varied experience in field & office on bridges, industrial bldgs., & utilities. Desires permanent position overseas. PW-2299, Engineering News-Record.

Construction Engineer Superintendent. Broad experience all phases waterworks, sewage, bridge, tunnel, industrial and heavy construction activities. Available September for field supervision construction for owner or contractor. Good organizer. Mature judgment. Registered Civil. Age 56. PW-2298, Engineering News-Record .

City Engineer and Building Commissioner of city of 35,000 in Illinois desires to make change. South preferred. Sixty-six years old, many years service Federal, State and municipal. Qualified for above jobs or city manager. Hold Illinois license, member American Society of Civil Engineers. PW-2377, Engineering News-Record.

Chief Auditor—Chief Accountant seeking new connection with reputable firm. Twenty years in above positions with leading engineering and construction firms in charge of finances, costs and administrative details. Experience covers large joint-venture, government and industrial cost plus projects. Also broad experience on heavy construction unit price projects. Now employed but desire change where experience may be more fully utilized. References and bond, will consider any location. PW-2376, Engineering News-Record.

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The men who qualify will enjoy the advantages of our pension, hospitalization and life insurance programs. Numerous employee recreational activities add to the friendly attitude Inland people share.

For an interview with us, give details of your work experience, job interests, education, age, marital status and salaries received.

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Opportunity for sales engineering work for energetic young engineer or construction man, 25 to 35 years of age for sales work in established territory with company operating on nation-wide basis furnishing metal forms for sale or rent to handle concrete forming work. General construction experience or some civil engineering training desirable. Give full details of background and experience in first letter to:

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Economy Forms Corporation
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Long established firm of consulting engineers with world-wide practice needs both beginners and experienced civil, electrical, mechanical, and foundation engineers for interesting work on large dams, powerplants, river control works and highways. Permanent positions. Liberal employe benefits. Starting salaries dependent on qualifications. Please send complete resume to Hugo Niemi, Personnel Manager.

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Charge of recently constructed 4 MGD standard rate trickling filter sewage treatment plant, sewer system and pumping station. Preferably graduate engineer with several years' operational experience.

Send full resume of training, experience, availability and acceptable starting salary to Board of Sewer Commissioners, Town Hall, East Providence, Rhode Island.

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Openings on the South Dakota Department of Highways staff present permanent opportunities for recent Civil Engineering graduates and experienced engineers in the following classifications and salary brackets:

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Benefits include sick leave with pay, paid vacations, military leave with pay, available hospitalization plan.

For application forms, contact:

C. V. DOODY, *Personnel Director*
Department of Highways
Pierre, South Dakota

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College graduates with minimum 6 years' work experience in industrial engineering, cost analysis or related activities. To provide industrial engineering services ranging in scope from shop layout to organizational changes in major oil producing operations.

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P-2382, Engineering News-Record
Class. Adv. Div. P.O. Box 12, N.Y. 36, N.Y.

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5 West 45th St., New York 36, N. Y.
220 Bush St., Sran Francisco 4, Calif.

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W-2383, Engineering News-Record
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WW-2354, Engineering News-Record
Class. Adv. Div. P.O. Box 12, N.Y. 36, N.Y.

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No Federal Aid for Schools

DEFEAT OF THE BILL that would have provided federal aid for school construction means that districts needing schools have no alternative but to put more effort into fund raising at state and local levels.

Studies of local school financing leave the impression that lack of funds for school construction is due more to unwillingness to pay than inability to raise the money. A close examination of reports made of school needs by the states to the U. S. Office of Education indicates that many of the richest states report the biggest shortages of funds for new schools, and many are spending a relatively small percentage of their income on schools.

The less wealthy states, of course, are bound to find it difficult to squeeze more money for schools out of taxpayers. Yet, as brought out at the White House Conference on Education, no state has proved it is financially incapable of building schools it will need during the next five years (ENR Dec. 8, 1955, p. 21).

In the long run, the nation as a whole will benefit in several ways if schools are paid for by local districts: The construction bill will be lower; for collecting taxes on a national scale and distributing them, plus the cost of supervision of final disbursement, is much more expensive than local handling of financing. There will be less interference with local programs by the federal government. Only the money actually needed for schools will be raised; no funds will be given to states that don't need them.

While defeat of the school aid bill can hardly be considered a blessing in disguise, it will do little harm if the local districts turn resolutely to other methods of solving the financing problem.

Russia's Needs—And Ours

WORRYING ABOUT RUSSIA'S DRIVE to develop more engineers and scientists, instead of concentrating on the development of our own in strict accordance with our needs, regardless of Russia, was pegged as rather pointless in an editorial on this page last March 1. The editorial aroused considerably more than average reader response—most of it favorable, but some highly critical, even to the point of questioning our patriotism and sanity. It was, therefore, encouraging to read recently that such an eminent educator, scientist and patriot as Dr. Lee A. DuBridge, president of the California Institute of Technology, had said the same thing more forcibly than we had.

Speaking at a conference in connection with a meeting of the National Committee for the Development of Scientists and Engineers, June 21, in West Orange, N. J., Dr. DuBridge said: "It is true that in Russia more men and women received degrees in science and engineering last year than in the United States. So what? Maybe that is because in the last 100 years they have so neglected their technical strength that they must now exert strenuous efforts to build it up.

"If this is true, then our rate of production should not be determined by their weaknesses—only by our own. Let us ask how many engineers we need to do our job, and not take over their figures or the numbers they require to do their job."

If Russia is now developing more engineers and scientists than the U. S., we agree: "So what?"

For Consultants and Their Staffs

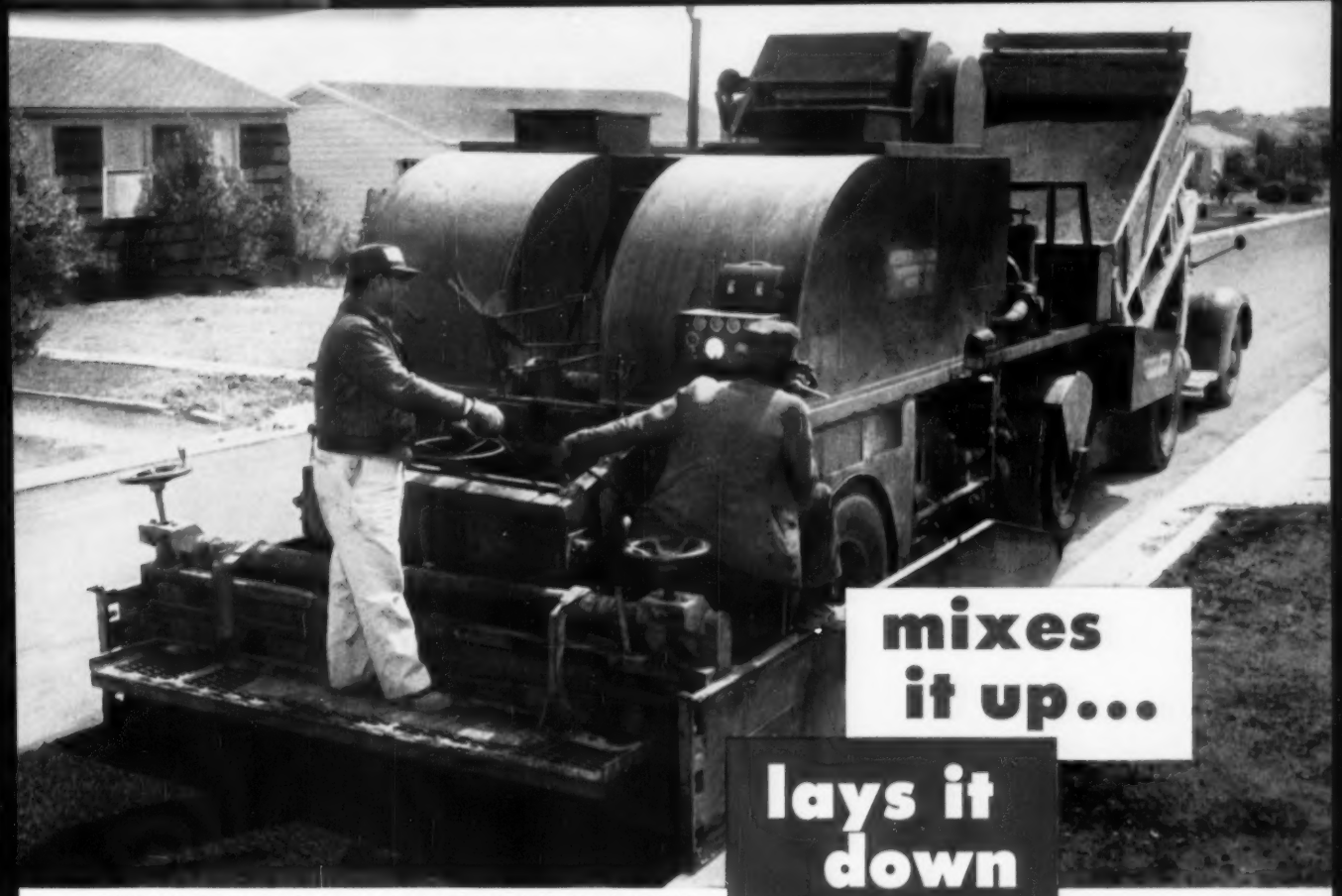
A FUNCTIONAL GROUP for exchange of ideas on the private practice of engineering has been set up within the framework of the National Society of Professional Engineers (ENR May 31, p. 26). This new unit is unique among organizations of consulting engineers in that it is to be open to employees of consultants as well as the partners or principals in consulting firms. There are many local and regional associations of consulting engineers, and recently a number of these have formed a national federation, (ENR July 12, p. 23) but the makeup there is exclusively management.

Roughly, the new group will correspond to the technical divisions of the Founder Societies, which also encompass employers and employees.

Inclusion of employees along with the consultants brought some objections when first proposed, but it is in line with the expressed NSPE policy of identifying engineering employees with the management team. Also it is in line with the desire of NSPE to improve the lines of communication between employees and employers.

In this new functional group the profession will have an opportunity to see what an employer-employee group of potentially large size and yet with well-defined common interests can do in a joint attack on the professional and business problems of private engineering practice. Here is promise of a truly professional answer to urgings for employee organizations among engineers. Here, too, is expressed the good intention to establish means by which lessons in the business of private engineering practice may be passed along to aspiring consulting engineers.

There is great appeal to the young men, the beginners in the profession, in this newly formed organization in NSPE. And there is the opportunity, if this works, to extend just such organizational machinery for work on engineers' problems in all the functional groups that logically can be established—engineers in government, industry, education, contracting, sales, and so on. NSPE's formation of its first such group deserves the attention—and the encouragement—of all engineers.



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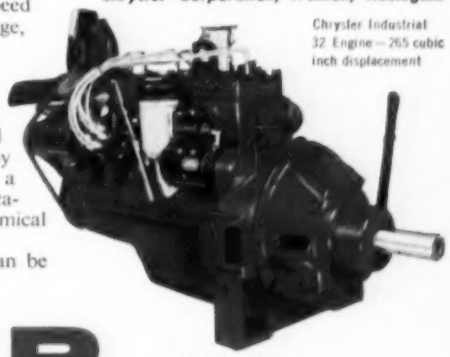

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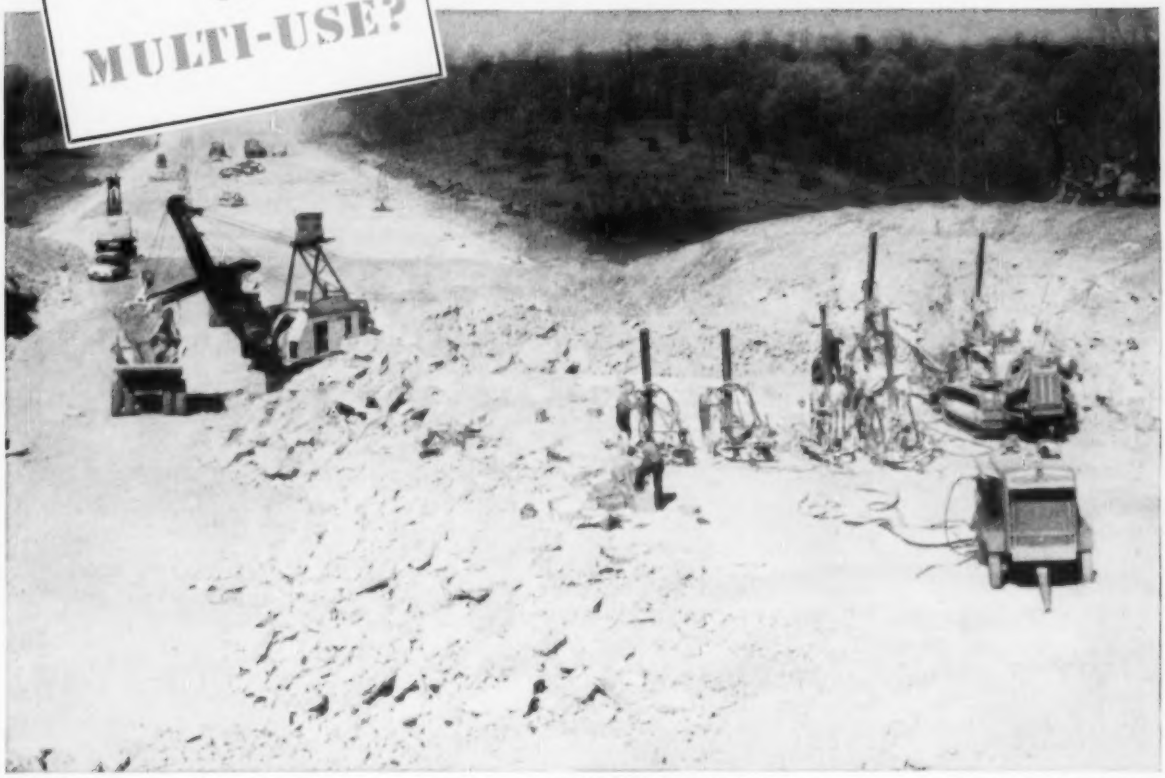


LOCATION: Highway 66, Laclede-Pulaski Counties, Missouri. **OPERATING CONDITIONS:** Conglomerate of Dolomite, Sand and Chert.

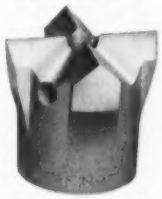
WAGON-DRILLING conglomerate of Dolomite, sand and chert efficiently and at least possible cost was the problem facing Porter-DeWitt Construction Co. in putting through Missouri Highway 66. But by using *both* Timken® multi-use and Timken carbide insert bits drilling operations on this 10-mile job were completed economically, speedily. For the soft limestone encountered, Timken multi-use bits gave the lowest cost per foot of hole and required less policing than carbide insert bits. Whenever full increments of steel can be drilled out, as in ordinary ground, with correct and controlled reconditioning, Timken multi-use bits will keep costs down.

But for extremely hard or abrasive ground—like the cherty limestone and conglomerate—Timken carbide insert bits are best. Porter-DeWitt found Timken carbide insert bits increased drilling speed, required fewer changes. You'll find, too, they're most economical for constant-gauge holes, small-diameter holes and extremely deep holes.

Another big advantage of Timken multi-use and carbide insert bits is that dozens of them are interchangeable on the same drill steel within the same thread series. Porter-DeWitt changed bits quickly, easily—right on the job.

Both types of Timken rock bits are made from the Timken fine alloy steel, and a special shoulder union protects threads from damage due to drilling impact.

For the right bit for your particular job call or write the Timken Rock Bit Engineering Service, The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".



Timken threaded multi-use rock bit

Timken threaded carbide insert rock bit

your best bet for the best bit ... for <u>every</u> job

TIMKEN

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